The Monthly Review of the AMERICAN ELECTROPLATERS' SOCIETY

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APRIL 1940

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The Monthly Review

Published by the AMERICAN ELECTROPLATERS' SOCIETY, Inc.

A Society for the Advancement of the Science of Electroplating

APRIL 1940

W. J. R. KENNEDY
Editor

W. W. McCORD
Associate Editor

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The MONTHLY REVIEW

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Editorial

In reading over the January REVIEW, the attention of your President was attracted to a short paragraph concerning the sparseness of discussions which follow papers given by the speakers at the various Branches.

Upon making inquiries here and there—and somewhat indiscriminately—he learned that although the Society has a splendid list of speakers available, covering practically every subject embraced in the metal finishing field, it is the practice of many of the Branches to leave the selection of the speakers to the librarian, three members of the Educational Committee, or most frequently to the chairman of this committee — that in all too many cases where the choice of the speaker and the subject is so made, this selection may not be that which the majority of the members of the Branch might wish for or in which they are most interested. This quite naturally tends toward a short and somewhat disinterested discussion of the subject as presented. Your President has attended Branch meetings where a speaker, after discussing his subject for perhaps an hour, is greeted with not a single question, and such a speaker would be perfectly right in inquiring, "Why did they ever invite me to speak, if the subject is of so little interest that it warrants no discussion?"

Believing that something might be done to create a better situation and understanding, your President offers the following suggestion:

Each year the Vice-president in charge of Educational Activities, after carefully canvassing the field for available speakers, prepares a list which he supplies to each Branch in multigraphed form. This list shows the speaker, his subject, and whether his services are available to the Branches without expense to them, or just what expense would be incurred. Now, rather than send a copy of this list to each Branch would it not be better to have a sufficient number prepared so that a copy could be sent to each member of the Society? The member could study the list and decide on the subjects that most interested him and mark these

by choice, possibly numbering them from one to ten, which is about the average number of Branch meetings where a speaker is invited. The Educational Committee of the Branch could then tabulate these choices, or votes if you prefer, and invite such speakers as the majority of the members of the Branch have expressed a desire to hear. In this way the Educational Program for an entire year could be quickly decided upon and ample time would be provided for each member to give some forethought to the subject to be discussed insofar as it affects his work, and then come to his meeting prepared to take an active part in the discussion following the giving of the paper. Such a program would seem to offer much in the way of encouragement to the speaker and could not be otherwise than helpful to both speaker and Branch members.

Your President realizes that the present time is rather a tardy one for bringing up this subject, but he is doing so not only for the reason that he feels it to be important, but also to enable the delegates to the coming convention in Dayton to receive the reaction of their several Branches to this suggestion. It could then be debated following the Annual Report of the Vice-president in charge of Educational activities, as it would be through his office that the plan would have to be suggested and carried out.

R. M. GOODSELL,
President

METAL AND PLATING IN THE TANK CORPS

The World War Tanks Corps Association is a young but growing group of Veterans which was organized several years ago in California, but is now spreading all over the United States. It numbers among its members some of the boys (now middle-aged men) in the metal and plating field. A prominent member of the New York group, which was organized about seven or eight months ago, is Walter Plumacher of R. Plumacher and Sons, New York.

All those who were in the Tank Corps and are interested in seeing how their old "buddies" have changed and improved with age, and would like to swap yarns of "the good old days," are invited to communicate with Walter Plumacher, 344 East 59th Street, New York, for full information.

1940 CONVENTION PROGRAM

LADIES' PROGRAM

Monday, June 10

Morning Attend opening of Convention with men.
Noon Bridge Luncheon with Fashion Show
Evening International Fellowship Club Party.

Tuesday, June 11

Morning Breakfast and gift presentation.
Afternoon Tour of The National Cash Register Co. with Organ Recital.
Evening Theatre Party.

Wednesday, June 12

Noon Luncheon, Bingo party, swimming and golf at Springfield Country Club.
Evening Aunt Emma's Party, and special entertainment.

Thursday, June 13

Morning Tour of Dayton Art Institute.
Evening Annual banquet, entertainment, and dancing.

MEN'S PROGRAM

Monday, June 10

Morning Business Session.
Afternoon Educational Session.
Evening International Fellowship Club.

Tuesday, June 11

Morning Educational Session.
Afternoon Factory trip through The National Cash Register Co., and Frigidaire Corporation.
Evening Educational Session.

Wednesday, June 12

Morning Educational Session.
Afternoon Educational trip and outing at the Springfield Country Club. Swimming, golf, baseball, and dancing.
Evening Educational Session.

Thursday, June 13

Morning Educational Session.
Afternoon Business Session.
Evening Annual banquet, entertainment, and dancing.

TENTATIVE EDUCATIONAL PROGRAM

Arranged by Educational Committee, H. C. Luechauer, Chairman

FIRST SESSION — MONDAY AFTERNOON, JUNE 10

VICTOR MINER, presiding
Toledo Branch

1. Metallurgical Aspects of Hydrogen in Electroplating. By *Carl A. Zappfe*, Research Associate, and *C. L. Faust*, Research Engineer, Batelle Memorial Institute, Columbus, Ohio.
2. Subject to be announced. By *Dr. Wm. Blum*, and *W. A. Olson*, National Bureau of Standards.
3. Effect of Small Impurities in Plating Solutions. By *Dr. D. T. Ewing*, Professor of Physical Chemistry, Michigan State College.
4. Patents in the Plating Industry. By *Col. H. A. Toulmin, Jr.*, Toulmin & & Toulmin, Dayton, Ohio.

SECOND SESSION — TUESDAY MORNING, JUNE 11

LEROY CRITCHFIELD, presiding
Lancaster Branch

1. The Trends of Electroplating. By *George B. Hogaboom*, Hanson-Van Winkle-Munning Co., Matawan, New Jersey.

2. Treatment of Steel Prior to Organic Paint Finish. By *S. J. Colvin*, Parker Rust-Proof Co., Detroit, Michigan.
3. Disposal of Plating Room Wastes. By *T. J. Fadgen*, Process Engineer, Ternstedt Trenton Division, General Motors Corporation, Trenton, New Jersey.
4. Plating Shop Economics. By *Dr. M. M. Beckwith*, Industrial Chemical Research, The J. B. Ford Sales Co., Wyandotte, Michigan.
5. Plating on Plastic Materials. By *Harold M. Karet*, The Electro-Metallizing Corporation, Buffalo, N. Y.

THIRD SESSION — TUESDAY EVENING, JUNE 11
GEORGE WAGNER, presiding
Newark Branch

1. Chemical Evaluation and Control in Metal Cleaning. By *Jay C. Harris*, Thomas & Hochwalt Laboratories Division, Monsanto Chemical Co., Dayton, Ohio.
2. Effect of Cleaning Technique on Adhesion of Electroplates. By *Dr. B. F. Lewis*, Northwest Chemical Co., Detroit, Michigan.
3. Absorption of Copper in Zinc Base Die Castings. By *F. F. Oplinger*, du Pont Electroplating Division, Niagara Falls Laboratory.
4. Pickling of Metals for Electroplating. By *Owen T. Towner*, Cincinnati Branch, Superintendent of Finishing, Auto Sun Products Co., Cincinnati, Ohio.

FOURTH SESSION — WEDNESDAY MORNING, JUNE 12
PHIL. J. RITZENTHALER, presiding
Milwaukee Branch

1. The Effect of Cathodic Film Motion on Electrodeposits. By *W. M. Phillips*, Head Electro-Chemistry Department, Research Laboratories Division, General Motors Corporation, Detroit, Michigan.
2. Subject to be announced. By *A. Brenner*, National Bureau of Standards.
3. Subject to be announced. By *M. R. Thompson*, National Bureau of Standards.
4. Subject to be announced. By *A. C. Simon* and *J. T. Lumley*, National Bureau of Standards.

FIFTH SESSION — WEDNESDAY EVENING, JUNE 12
STANLEY HEDDEN, presiding
Pittsburgh Branch

1. Study of Sodium Stannate Tin Plating Solutions. By *Fred Bach*, Frigidaire Corporation, Dayton, Ohio.
2. Lead Plating in Lead Acetate Baths. By *Dr. F. C. Mathers* and *J. Schwartzkopf*, Indiana University, Bloomington, Indiana.
3. Magnesium as a Control Agent for Zinc Anodes. By *R. O. Hull*, du Pont Electroplating Division, Experimental Laboratory, Cleveland, Ohio.
4. Studies in Bright Nickel Plating Process. By *Dr. C. B. F. Young*, Electrometallurgist, Columbia University, New York, N. Y.

SIXTH SESSION — THURSDAY MORNING, JUNE 13
ROBERT KNOEPFLER, presiding
Cincinnati Branch

1. A Short Research on the Effect of Basis Metal Polishing on the Character of Nickel Plate. By *Walter L. Pinner*, General Spring Bumper Division, Houdaille-Hershey Corporation, Detroit, Michigan.
2. The Relative Effect of Various Polishing Finishes on Corrosion Resistance of Electroplated Nickel Deposits on Steel. By the Toledo Branch.
3. New Equipment for Treating Parts in Bulk. By *Gustaf Soderberg*, The Udylite Corporation, Detroit, Michigan.
4. Magnesium Copper Sulphide Rectoplaters as a Source of Direct Current Power for Electroplating. By *C. A. Kotterman* and *W. Binai*, P. R. Mallory & Co., Indianapolis, Indiana.
5. Hard Chrome Plating Plastic Molds. By *A. W. Logozzo*, General Electric Co., Pittsfield, Mass.

Recent Developments *in* Bright Zinc Plating

Read at Newark Branch Meeting December 1939

By CLARENCE W. SMITH
Philco Radio and Television Corporation
Philadelphia, Pa.

PROCESSES for bright zinc plating were first introduced to the plating trade in the latter part of 1935. With these processes, it became possible for the first time to produce lustrous smooth deposits from cyanide solutions.

In the case of the very early zinc plating processes, deposits of practically pure zinc are produced from purified plating baths, without the use of organic or other metal addition agents. These pure deposits respond satisfactorily to a number of acid bright dips, while impure deposits, that is—deposits containing such heavy metals as lead, copper, tin, cadmium, arsenic, etc. turn dark and streaky when an attempt is made to bright dip them.

In all bright zinc plating processes that have come to my attention, the most important single factor in producing deposits of good appearance narrow down to maintaining the plating solution free at all times from the dangerous heavy metal impurities. Impurities normally present in making up a new plating solution, such impurities as traces of cadmium, lead and copper, which are also present in the anodes, can be removed from the solution by means of sodium sulphide, sodium hyposulphate or a combination of both. The use of zinc dust as a bath purifier is used in one process, either alone or in combination with hypo, to precipitate the heavy metals. However, in all cases, copper is removed only with difficulty, and if a bath should, during operation, become contaminated with copper (0.02% or more), the last traces are removed only by electrolysis at low current densities on large dummy cathodes. Purified solutions are usually filtered before being put in operation, and from time to time after continued use. In any case, it is important to remember that contamination of the plating solution due to copper should be carefully guarded against, especially from outside sources. A normal quantity of copper, such as 0.001 to 0.002% by weight of plating bath is not harmful. However, the presence of 0.008 to 0.01% of copper can be observed as affecting the bright dipping qualities of the deposit.

At this point it is important to point out that only pure zinc anodes of the highest purity should be used for any of the bright zinc plating process, in order to keep impurities and the resultant sludge formation in the plating bath at a minimum. Good quality zinc anodes of 99.99% zinc content are supplied by a number of manufacturers today.

FIRST BRIGHT ZINC PLATING PROCESS

One of the earliest bright zinc plating processes introduced to the trade during the late months of 1935 is worthy of discussion, for from it we are better able to point out its numerous shortcomings when compared to the solutions of today.

The composition of this solution was as follows:

	oz./gal.
Zinc cyanide (zinc—5.5 oz.)	10
Sodium cyanide (Total CN as NaCN—15.4	7
Caustic soda	10
Hypo	1/2 to 3/4
Sodium sulphide	1/15

OPERATING CONDITIONS

A. Temperature—Bath was operated at normal room temperature, no attempt being made to control temperature range by heating or cooling.
B. Current Density—A cathode current density of 35 to 40 amps./per S.F. Anode current density 20 to 25 amps. per S.F.
C. Voltage—3.0 to 3.4 (across bus bars; bath temperature of 80° F.)
D. Plating time—5 minutes (fully automatic equipment).
E. Thickness of plate—0.00015 inches at 80° F (70% Cathode Current Efficiency).
0.0002 inches at 105° F. (92% Cathode Current Efficiency).

The deposit obtained from this solution was quite white and lacking in lustre at low current densities, such as from 5 to 10 amperes per S.F.; at high current densities, such as from 35 to 40 amperes per S.F., or above, the deposit is bright and lustrous when plated at room temperature. However, at higher temperatures such as at 95° to 100° F., the deposit is much whiter at all current densities, lacking the brightness so characteristic of the brightness obtained between 70° to 80° F. It became very evident that to do satisfactory bright zinc plating on large parts, or parts having an area of 3 to 4 square feet, it is necessary to prevent temperature rises much above 90° F. Even under operation at the proper temperature, the deposit is considerably whiter on center and recessed areas of large parts where the average cathode cur-

rent density is considerably below the 35 to 40 amperes per S.F. necessary for bright plating.

While operating the early bright zinc solution, a great deal of laboratory work was done to determine whether or not the bath composition could be improved upon in regard to increasing the brightness at higher temperatures, which would have been very desirable due to the higher cathode current efficiencies which would result. Also during summer weather, it was impossible to maintain the plating solution much under 95° to 100° F., due to heavy production demands at higher than normal room temperatures, unless refrigeration was resorted to.

The following conclusions were made:

First, the sodium cyanide content in the standard solution, where additional agents are not used, should be maintained between 70% to 75% of the zinc cyanide content. (For zinc cyanide equal to 10, maintain the sodium cyanide between 7.0 to 7.5 ozs. per gal.) Operating with higher sodium cyanide content, namely 8 to 9 ozs. per gal. results in excessive solution of anodes, in addition to reducing the cathode current efficiency by 10% for every added 1 oz. of sodium cyanide per gal. of solution. The plating is slightly brighter as at 8 ozs. per gal, but not enough so to offset the disadvantages given. Lower sodium cyanides (such as 5 to 6.5 ozs. per gal.) while increasing cathode current efficiencies, causes a reduction in brightness of the deposit. The lower free cyanide also reduces throwing power especially at the higher solution temperatures which is often sufficient to bring out bare spots around recessed holes in many parts, probably aided by excessive gas sweeping out and preventing good solution contact at these points. Such a condition of bare spots on plated articles can be eliminated by increasing the sodium cyanide, by increasing the caustic soda by 2 ozs. per gal. or by addition of certain additional agents to be mentioned later on. However, for maximum brightness of plating, maintaining the sodium cyanide at the proper ratio is all-important.

Second, with the zinc cyanide and sodium cyanide proportion and amount fixed for best results, the caustic soda shall be maintained at least equal or slightly greater than the zinc cyanide content. With a bath containing 10 ozs. per gal. of zinc cyanide and 7.0 to 7.5 ozs. of sodium cyanide, the caustic soda should be maintained between 10 to 11 ozs. per gal.

Third, the maximum limit for the zinc cyanide content for this solution was found to be 12.5 ozs. per gal. In this case, the sodium cyanide should be maintained between 8.5 to 9.0 ozs. per gal. and the caustic soda between 12.0 to 13.0 ozs.

BRILLIANT ZINC

By the addition of small quantities of Molybdenum in the form of MOO_3 to the plating bath, together with the organic addition agent, it is possible to plate a very bright zinc deposit considerably higher in lustre than any of the best cadmium deposits. However, in using this process—Zin-O-Lyte bath of Grasselli—it is necessary to operate with slightly higher free cyanide and at temperatures of 95° to 100° F. to obtain the increased brightness of deposit.

A study of the following baths as to appearance of plate, cathode current efficiencies, and effect of temperature was made.

COMPOSITION	*BATH No. 1*	*No. 2*	*No. 3*	*No. 4*	*No. 5*
	In ozs. per gal				
Zinc cyanide	10	10	10	10	10
Sodium cyanide	7	7	8.5	8.5	8.5
Caustic soda	10	10	10	10	10
Molybdic oxide (85% MOO_3)	—	1.7	—	1.7	1.7
Hypo	1/2	—	1/2	—	1/2
Sodium sulphide	1/15	—	1/15	—	1/15
RH-309 organic (Brightener)	0.15	0.15	0.15	0.15	0.15
Ratio $\frac{\text{Total NaCN}}{\text{ZN}}$	2.75	2.75	3.00	3.00	3.00
Remarks:		Purified with zinc dust		Purified with zinc dust	

These solutions were studied over the temperature range of 75° to 115° F. and from 8 to 70 amps. were S.F. cathode current density.

It was seen at once from the distribution of the data that no efficiency variation to speak of was introduced with the addition of 1.7 ozs. per gal. of MOO_3 (0.74 oz. as molybdenum metal). It is obvious from these curves that it is not economical to operate below 90° F. This conclusion is borne out by inspection of the brightness of the plated samples. The following observations are the result of plating a large number of samples over the range of variables given.

For all baths, other conditions being equal:

1. Bright current density range moves up with temperature.
2. Brightness increases with temperature.
3. Brightness increases with increase in R (total NaCN: ZN ratio); very markedly with the presence of 1.7 ozs./gal. of (MOO_3).

4. When R equals 3, the molybdate bath is generally brighter, especially at high current densities (over 30 A /S.F.) That is, molybdenum increases the brightness and bright current density range for R equals 3.0.
5. For low values of R (R equals 2.75) solution No. 1 gives brighter work than the No. 4 or No. 5 bath (molybdate bath) at all temperatures and current densities.
6. There was no discernible difference between baths No. 4 and No. 5; that is, the presence of sulphides did not interfere with the action of the molybdenum.
7. It was found necessary to bright dip, in order to develop maximum brightness on still or conveyor tank plating.
8. Tests made on the composition of zinc deposits from the molybdenum baths show the zinc deposit to contain between 0.90% to 1.10% of molybdenum. The molybdenum is maintained in the bath by addition of MOO_3 directly to the plating solution. It is added slowly, with stirring, in order to become distributed throughout the solution. Approximately one pound of MOO_3 is required for every 50 lbs. of zinc metal deposited in still or conveyor tank plating. The added material costs of using No. 4 or No. 5 would be approximately 25% greater than the material costs of operating with bath No. 1.
9. Salt spray tests conducted on many plated samples of various thicknesses indicated that no added corrosion resistance is imparted to the zinc plate by co-depositing the small quantity of molybdenum.

CONTROL OF BRIGHT ZINC PLATING SOLUTIONS

The control of bright nickel plating solutions is quite simple.

We have found that for every 1000 lbs. of zinc metal deposited there is roughly required (when using a temperature of 95° to 100° F. and 40 to 45 amps. per S.F.) the following chemicals:

Zinc cyanide	None
Sodium cyanide	650 lbs.
Caustic soda	275 lbs.
Hypo	50 lbs.
Sodium sulphide	5 lbs.
RH-309 Brightener	2 gals.
Molybdic oxide	20 lbs.

One of the difficulties always associated with a zinc cyanide plating solution has been the marked tendency of zinc anodes to go into solution when the latter is idle. With present-day bright zinc solution, this condition still exists even with the lesser solubility of high purity zinc anodes in alkaline solutions. The result is that the solution builds up in metal content, necessitating a slight dilution before the composition can be correctly balanced again. The only remedy to diminish this action is to remove anodes from all tanks when solutions are idle, as over week-end periods.

The anode current efficiency of all bright zinc (cyanide) solutions is always near 100% under the various operating conditions met with, while the average cathode current efficiency is around

80% with a peak of 85% with the lower cyanide baths (R equals 2.75). Operating under these conditions would normally result in a slight increase in metal content of the solution. However, this increase of metal is greatly reduced by loss of zinc in solution drag-out, so that the solubility factor is the real important factor resulting in metal content increase of the solution. We therefore have found it necessary from time to time to make about 5% by volume dilution to compensate for the increase of zinc in solution. The dilution required averages less when working two and three shifts per day than when working only one shift, proving quite definitely that solubility is a more important factor in causing a rise in the zinc content of the solution than is the difference between anode and cathode current efficiencies.

In any case, it is well to remember that the proper ratio of sodium cyanide (or expressed as total NaCN to ZN) be maintained at all times along with the proper high caustic soda content, otherwise bright or brilliant zinc plating will not result. Many of the solutions I have come across which failed to give bright zinc deposits showed upon analysis as high as 15 ozs. of zinc cyanide per gal. In cases of this kind, the proper dilution and addition of sodium cyanide and caustic soda to bring back to proper composition ratio, was all that was required to start them off again in giving satisfactory plating.

BRIGHT DIPS

There are a number of bright dips which have been recommended for zinc. The most important of these are as follows:

1. Nitric Acid—1/3% to 1/2% of HNO_3 by weight.
2. Peroxide—3.2% H_2O_2 by volume
   0.5% H_2SO_4 by volume
3. Chromic acid—a. 35 ozs. CrO_3 and
   2 ozs. Na_2SO_4 to the gal.
   b. Followed by 1/2% H_2SO_4 by volume.

The chromic acid dip gives the brightest and smoothest finish and is the hardest to operate. A very quick dip (less than three seconds) is required, followed by a thorough rinse in water, then 1/2% H_2SO_4, rinsed again and finally dried. Anything less than a protracted rinsing cycle means a badly stained plate.

The peroxide sulphuric acid dip gives initially a slightly brighter plate than the dilute nitric dip, but there is a decided tendency for discoloration of the plate on aging. In addition, the peroxide dip

shows greater corrosion and has a narrower working range, both as to temperature and time, and if not renewed quite frequently, fails to give satisfactory results.

The dilute nitric acid dip is by far the best all-around dip for zinc. It is necessary to have at least two cold rinses following the plating operation, and one cold rinse after plating, in order to operate satisfactorily. This dip will last for a 7 to 8 hour shift, giving very good results on as high as 10,000 various shaped parts (requiring 4 gals. on 40% nitric acid). It is best to make up this dip new when strength becomes reduced to below 0.20% HNO_3.

In order to further protect and seal bright zinc plating from staining due to handling of plated parts in humid weather, a very thin-dipped coating of a shellac type of water-dip lacquer is recommended.

I would like to thank the du Pont Company for permission to divulge information regarding their bright zinc and brilliant zinc plating processes.

WING YOUR WAY TO DAYTON, THE BIRTHPLACE OF AVIATION

NEWS FROM THE HOT NOSE REPORTER

The last meeting of the Detroit Branch of the Platers' Society produced something unusual. Two meetings were held simultaneously. One meeting was held in the regular chambers and featured a very interesting talk by Mr. Beaver on burnishing. The other was held in several friendly cocktail lounges by some of the lighter hearted members of our little colony. However, they still maintained a certain degree of loyalty to good old A.E.S. by keeping in touch with the regular meeting by wire. It was quite a night.

Will the person who sent Floyd Oplinger the telegram asking for a good cyanide copper solution raise his hand?

Speaking of meetings, all of the plating elite of Detroit turned out to get in the thick of things at the A.S.T.M. regional meeting held here during the week of March 4. Carl Heussner, Jim Higgins, Gus Soderburg, Red Wilson, Dick Saltonstall, and all of the boys were on hand. Your correspondent got a chance to wave to Ervin Sohn, genial research head man for National Sanitary and Mfg. Co.

All the boys are looking forward to hearing Dr. Blum speak at the next meeting. Dr. Blum does not visit us very often and he certainly packs them in.

Incidentally the Detroit Branch meeting was postponed to April 12.

Flash! Art Barnett, formerly finishing superintendent for Steel Materials, Inc., has just been promoted to the job of assistant works manager. Art is a nice guy, knows his stuff and rates the best.

Bill Phillips heard the ponies were running nicely in Florida and packed the whole family off including himself for a southern jaunt.

Someone told us that Mr. Leroy Beaver boasts about his speeches being extemporaneous. Perhaps his notebook and glasses are for effect or to tell when it's time to close the speech. Other people say that Mr. Beaver may be stretching the truth a wee bit because they can't figure out how anyone can talk that long without the help of notes.

Electric Cleaners

By A. C. WEST
Chief Chemist, Canadian Hanson & Van Winkle Co., Limited
Read at Toronto Branch Meeting on January 5, 1940.

OBSERVATIONS which I have made during the past few years lead me to the conclusion that the trend in electric cleaning is directed towards increased use of reverse current. Up until the last few years, most of us have felt that the only job that the electric cleaner was called upon to do was remove visible oil and grease, and sometimes a portion of the inert solid particles. Provided the base metal was free of visible solid particles and gave no water break when rinsed in cold water, it was thought that the cleaning job was complete. Sometimes, in spite of apparently perfect cleaning, there would be poor adherence of the plate. This was hard to explain. Some of us blamed the cleaner, while others blamed the plating solution. No one seemed to have a very good explanation to offer.

I am going to offer you an explanation here which will place the blame neither on the electric cleaner nor the plating solution, but on the method of using the cleaner. I have very strong reasons for believing that when metal is cleaned with direct current, films may be formed which can only be removed by reversal of current. During the cleaning of nonferrous metals, small traces of copper, zinc, lead, tin, etc., will enter the solution and will be plated out again on the work when direct current is used. In most cases these films affect adversely the adherence of the subsequent electroplate. This is particularly true when the plate is nickel followed by chromium.

I believe that one of the reasons trouble has been experienced in the use of certain cleaners in hard water areas is that an invisible film of calcium salt is formed on the work when direct current is used. I have been able to prove that in the case of water extremely high in calcium, this film actually becomes visible. This film makes it impossible to plate an adherent nickel over steel. Reverse current removes the film and leaves a clean surface for an adherent plate. Furthermore, the suggestion has been made by others that electric current will break down some soaps and wetting agents, and result in the formation of a film on the work

which cannot be rinsed off in water. I have never seen any evidence of this myself, but if such things can happen, it seems reasonable to conclude that reversal of current might remove this film.

The most common of these types of films is the film caused by the presence of small amounts of nonferrous metals in the cleaner solution. If brass is cleaned in a solution which has been used for cleaning die castings, it will come out with what appears to be a chromium plate. Reversal of current for a few seconds removes this film. If the brass is nickel plated without removing the film, the nickel plate will not have good adherence. On the other hand, if the film is removed by means of reverse current, the adherence will be good.

Take the case of the cast brass plated by the plumbing supply houses. It contains approximately 85% copper, 5% zinc, 5% lead, and 5% tin. There has always been considerable difficulty in plating this kind of brass ever since chromium plating came in. All sorts of excuses were offered. I have heard it stated that the metal was no good; that it was not deoxidized properly; that it contained too much lead; that an adherent nickel could not be plated over any brass that contained lead unless the brass was first copper flashed. The cleaner was stated to be unsuitable; a muriatic acid dip was recommended; a special etch in ammonium citrate solution was developed by some English investigators. Now it has been found that there is no difficulty in obtaining an adherent deposit of nickel over cast brass, provided ordinary direct current cleaning is followed by reverse cleaning in a separate tank for a few seconds. No copper flash is required. This procedure is being used widely in the United States and Canada.

Not only is this cleaning method cheaper and faster than copper flashing, but it gives better results.

Take the case of zinc base die castings. There is always more or less trouble with blistering of the copper-nickel-chromium plate on die castings, especially when the plated die castings have to be baked in connection with a subsequent painting operation. Most of the causes of this trouble have been traced down during the past few years. One of the chief contributing causes was found to be overcleaning. By overcleaning is meant too long a time in the electric cleaner. Most platers now agree that where direct current is used in cleaning die castings, the time should be cut

down to a minimum (15 seconds or less is recommended). Also, a new cleaner should be made up every few days at least. The use of electric cleaners through which too many die castings have passed promotes the plating out of a non-adherent zinc film on the work. Too long a cleaning time in a cleaner only mildly contaminated will have the same effect. I have seen this happen many times, both in experimental work and in the field, and have had my opinion corroborated by others.

It would seem that one way of preventing the plating out of a film on zinc base die castings would be to clean them anodically. I believe that when die castings have been through the degreaser, 5 or 10 seconds reverse cleaning will suffice. Where no degreaser is available, it would be best to clean for a short time with direct current, followed by 5 seconds reverse. Of course, in the cleaning of zinc base die castings the time of reverse current cleaning and the concentration and type of the cleaner used would have to be watched very carefully, in order to avoid etching the die castings.

Anodic cleaning of die castings is becoming more and more popular, both in the United States and in Canada. At a recent meeting of the Detroit Branch of the A.E.S., there was quite a discussion on this subject, and as a result, it developed that anodic cleaning was the best method yet found for securing the necessary adherence for baking at high temperatures.

Last, but not least, let us consider the cleaning of steel. Those of you who have read the latest convention report probably noticed the paper by F. C. Mesle, on "The Adhesion of Electrodeposits." I am going to quote from this paper as follows: "After experimenting with a hundred or more cleaning methods or combination of methods, it finally developed that when cathodic treatment in alkali cleaners was omitted, the adherence of the nickel to steel was 100%." In other words, better adherence was found without any current than with the aid of direct current.

Then he goes on to say: "The use of current in some alkali cleaners is definitely a cause of poor adhesion of nickel to steel and silver to steel, while a hot copper strike seems to overcome the cause of poor adherence to steel when some electric cleaners are used." The copper strike has long been used in order to overcome the defects of cathodic cleaning. My own experience indicates that when anodic cleaning is used, either by itself or subsequent to cathodic cleaning, there is no need for a copper flash in order to

get required adherence. Mr. Mesle's experiments are proof of the harm that can be done by direct current. He did not investigate the effect of reverse current, but I am sure that if he had, he would have found the film formed by direct current could be removed.

I would like to point out that poor adherence is not always noticeable in the form of peeled plate or blisters, but may show up in the form of early failure when the article is put into use. We have all seen automobile bumpers where part of the plate has peeled off. Some people might feel that my assumption that these phenomena are caused by films is incorrect, and that when poor adherence results from cathodic cleaning it is caused by the absorption of hydrogen. This may be true in some cases, but if true it merely supplies another argument in favor of anodic cleaning.

I think I can now see the reason why some electric cleaners seem to work well at first, but after a few days give rise to poor adherence of the nickel plate. The next time this happens, my advice is—reverse the current. My idea would be to clean steel that has been degreased in Royalene entirely with reverse current. Steel which has not been degreased may in some cases require the more vigorous gassing action of the direct current treatment to remove oil, but should be finished off with reverse current in the same or in a separate tank. In the cases of zinc base die castings, I believe that the cleaning should be entirely reverse wherever the die castings have been previously degreased. A special cleaner is necessary in this case, however. Brass should be cleaned cathodically for about one minute, and then with reverse current for a few seconds. In the case of nonferrous metals, it is not wise to use both direct and reverse cleaning in the same tank. It can be done, but if it is, the cleaners will have to be dumped much more often. An extra tank will soon pay for itself in cleaner savings. These suggestions are not final, and I may want to modify them slightly as I explore further into this field of reverse current cleaning.

When reverse electric cleaning is used, the film which would ordinarily form on the work forms on the other electrode instead. In some cases, this is the tank. The film will build up to such a thickness that it will offer considerable resistance to the passage of current, thus slowing up the cleaning process. A better arrangement is to have steel sheets for cathodes. These cathodes can easily be removed and cleaned when necessary.

In conclusion this may be summed up as follows:

(1) Direct current cleaning causes the formation of films on the work, which cannot be removed by ordinary acid or cyanide dips.

(2) These films may consist of calcium and magnesium compounds, nonferrous metals, such as copper, tin, lead, zinc or decomposed soaps or wetting agents. In addition, films may be formed from other sources.

(3) Such films affect adversely the adherence of metal plated over them.

(4) These films can be removed or can be kept from forming on the work by using reverse current.

WING YOUR WAY TO DAYTON, THE BIRTHPLACE OF AVIATION

New Haven Branch of the A.E.S. on Tuesday, March 12, heard the ninth lecture in the Metallurgy Class series, given by Ben McGar of the Chase Brass and Copper Co., Waterbury, Conn. The lecture was entitled "Mil! Finishing of Copper and Copper Alloys," and was illustrated by some fine slides. An outline of the lecture is listed below:

1. Wrought material furnished in four forms: sheet, tubing, rod, wire.
2. Sheet rolling: hot, cold, combination of hot and cold.
3. Annealing: normal and controlled atmosphere.
4. Cleaning annealed sheet: mill pickle, bichromatic dip, continuous pickling and drying.
5. Finishing hard rolled sheet: oil, kerosene, emulsion and dry rolling; acid dipped trim bronze; pattern rolling; drawn shapes from sheet; brazed tubing from sheet.
6. Tubing—methods of production: cast shell, pierced from billet, cupping process—from sheet, extruded from a billet.
7. Cleaning annealed tubing: mill pickle, dichromatic dip, prevention against staining.
8. Bright annealing of copper tubing.
9. Annealing and cleaning of copper: nickel alloys.
10. Tinned tubing: hot tin, electrolytic.
11. Drawing lubricants.
12. Rod—methods of production: brass, extruded, copper, hot-rolled.
13. Extruded shapes: regular—assembly with sheet and tubing, bright.
14. Drawing lubricants.
15. Wire—methods of production: importance of treatment on intermediate sizes.
16. Annealing and cleaning: strand annealing.
17. Drawing lubricants.

Following the lecture, there was an interesting discussion, after which there was discussion of shop problems led by Tom Chamberlain.

A business meeting was held Tuesday, March 19, with President Henry Creamer presiding.

The meeting of the metallurgy class on Tuesday, March 26, was featured by the appearance of Dr. W. A. Mudge of the International Nickel Co. as guest lecturer. Accompanying the lecture, was a one-reel sound movie. Due to the widespread interest which this lecture had brought about, it was an open meeting.

JOE SULLIVAN, *Secy.*

Silicates *and* Their Application *to* Metal Cleaning

HISTORY AND LITERATURE

By KENNETH P. BELLINGER
Chemical Corporation, Springfield, Mass.

Presented before the Hartford Branch of the American Electroplaters' Society on October 16, 1939; and at the Waterbury Branch on February 9, 1940.

CONSIDERING the important place that silicates occupy in modern industry, there have been surprisingly few books printed on them. About twelve years ago, Vail of the Philadelphia Quartz Company published his "Soluble Silicates in Industry," which refers to a great many abstracts and articles that had appeared up to that time.

The history of silicates is relatively modern.[1] Reference is made by Van Helmont in 1640 to the fact that silica with an excess of alkali would become liquid in damp places. However, it was not until 1818 when Von Fuchs dissolved silica in caustic potash and observed its glasslike properties, that water glass was discovered. Fuchs must have spent considerable time and study on the matter as he proposed several of the modern applications, such as glues, mortars, fireproof paints, binders for colors and frescoes, soldering flux, and for the laundry and textiles.

[1]It was about the year 1864 when silicates first became a topic of interest in the United States. This was during the Civil War, when the supply of pine oil and resin having been shut off, they began to be used as a substitute for resin. Their acceptance into industry was slow, however, and by the turn of the century the tonnage was still small.

STRUCTURE

The name silicate is very broad, and at this time I would like to explain in detail the group we are interested in. Silicates refer to any combination of alkaline oxide and silicon oxide in combination. For simplicity and because of its practical application we can limit this discussion to the oxides of sodium.

We now have a group that varies roughly between the following limits:

$2\ Na_2O$:	SiO_2.....Na_2O :	SiO_2.....Na_2O :	$4\ SiO_2$
Ortho	Meta		Water glass

It is probably underestimating it to state that there are some thirty or forty odd commercial compounds and mixtures offered within the above limits. We are most interested in the following compounds:

Sodium orthosilicate	Ratio 2 : 1. Appearing on the market as commercially anhydrous material (about 5% water), and with 5 molecules of water.
Sodium sesquisilicate	Ratio $1\frac{1}{2}$: 1. Appearing on the market as commercially anhydrous material (about 5% water), and as a hydrate. $Na_6Si_2O_7 : 11\ H_2O$.
Sodium metasilicate	Ratio 1 : 1. Appearing on the market as an anhydrous material and with $5\ H_2O$.

MANUFACTURE

I would like to describe somewhat the manufacture of these silicates. Silica is one of the most available products in the world. There are many naturally occurring deposits of sand which are almost pure silica. Roughly it comprises about sixty per cent of the earth's crust. Following are some of the more common methods used in its manufacture.

1. A fusion of caustic soda and silica at about 5 to 600° centigrade to give an anhydrous product.
2. Fusion of soda ash and silica, at an even higher temperature.
3.[1] Na_2S + a high ratio silicate + steam = a lower ratio silicate + hydrogen sulphide.
4.[1] This reaction takes place in two steps.
   $2\ Na_2SO_4 + C = 2\ Na_2O + 2\ SO_2 + CO_2$
   $Na_2O + SiO_2 = Na_2SiO_3$
5.[1] In their natural state rice hulls contain about 35% by weight SiO_2. Advantage is taken of this, by charring the rice hull and leaching the resultant mass with caustic soda to obtain silicate as well as carbon.

COMPARISON OF ALKALIES

Along with the silicates I have decided to consider the other common detergents as well as caustic soda. (A detergent being any material having cleansing properties.) Caustic soda is, of course, the strongest cheap alkali, but it has relatively little or no

detergent properties. However, recently it has become of interest because of its conductivity, due to the use of highly concentrated cleaner solutions.

A discussion of detergency under several headings will serve to clarify its meaning.

Neutralization. This usually refers to some dirt of an acid nature and demands a material of high Na_2O value to neutralize it with any degree of rapidity.
Example: Rancid oils.

Saponification. This naturally refers to the ability of an alkali to saponify fatty materials and make soaps.

Conductivity. In electrolytic cleaning conductivity becomes a factor of prime importance because the more current the solution can carry, the faster gas formation takes place, resulting in more mechanical action. This naturally applies to the cleaning of steel, for in the cleaning of brass and softer metals the maximum amount of current that can be drawn is often not of prime importance.

Defloculation and Emulsification. This is the ability to disperse dirt; that is, to remove it in a state of suspension. This is also a factor in keeping removed dirt from redepositing on the parts being cleaned. This particular classification is also of interest in the laundry field as well as in the flotation of ore. In this classification silicates are very outstanding, both from the standpoint of laboratory work, which can be interpreted into charts and graphs, and from their practical application in the field, which is directly interpreted from the very large tonnages used for laundry and metal cleaning.

Stability. This refers to the ability of the alkali to resist any breakdown, either through storage before application, or in solution when heat or current is applied.

Buffer Action. This is the ability of an alkali to maintain a desired pH (not necessarily the highest one) for a long period of time. It is also used with reference to the resistance of attack to soft metals.

Wetting of the Surface and Penetration of the Dirt. These two properties are naturally of the utmost importance in considering any cleaner. The silicates possess these properties to a more marked degree than do any other alkalies. The interfacial surface tension between oil and silica is very low; emulsions are formed with water as the continuous phase. This particular property is often further enhanced by the use of soap or a wetting agent.

Colloidal Action. Silicates are the only common cheap alkalies that approach true colloids in their characteristics.

This is naturally an advantage tending to stabilize subsequent emulsification and defloculation. It involves the disposal of dirt which cannot be dissolved.

These features also make silicates most effective for cleaning the softer metals because through their colloidal properties, they act as inhibitors against alkaline attack, permitting the use of stronger, faster acting materials without etching the surface. Their precipitates being very voluminous present a much greater resistance to attack than do precipitates of phosphates and carbonates.

Solution. This is self-explanatory, and a good example is the inability of alkaline solutions to hold any quantity of mineral oil.

pH. In simple terms we might say that this is the measure of the activity of the solution, and quite probably could be classed along with conductivity.

Water Softening. If it were possible to remove the resultant precipitate formed, we might consider the silicates excellent water softeners. They have the disadvantage of precipitating with hard water. This disadvantage can be corrected to a certain extent by the use of tetrasodium pyrophosphate, trisodium phosphate, or soda ash. Where the hardness of the water is above 10 grains per gallon, it is necessary to use a very low ration of SiO_2 silicate. These are my own observations, and they tend to differ somewhat with what is found in literature on the subject.

Rinsing. Because of the excellent emulsifying and colloidal properties of the silicates, together with the very voluminous gels that they form they rinse particularly easily. Similarly they tend to prevent redeposition of dirt in suspension.

By the examination of some tables and graphs comparing silicates to other alkalies, I believe we can get a clearer picture of the application of silicates in the metal cleaning field.

The following table is based upon 3% solutions (4 ounces per gallon).

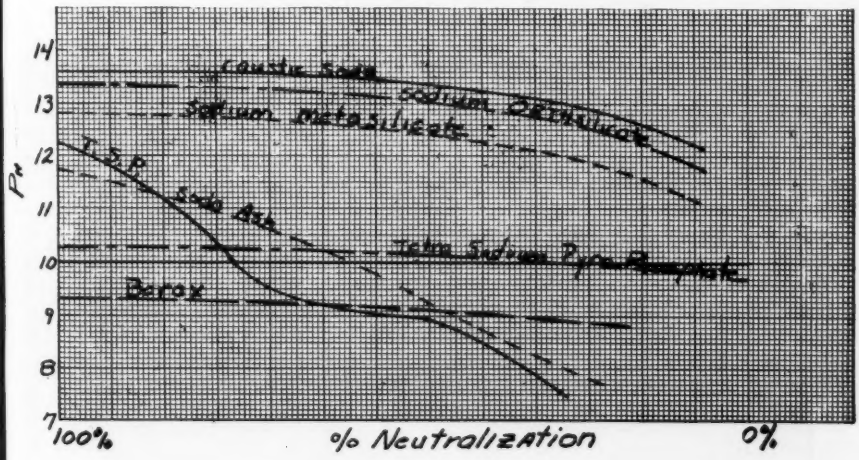
Alkali	*pH*	*c. c.'s NH_2SO_4 Before pH drops below 10*
Soda ash	11.7	178.80
Trisodium phosphate (hyd.)	12.3	79.13
Sodium sesquisilicate (hyd.)	13.1	317.80
Sodium metasilicate (hyd.)	12.8	181.10
Sodium orthosilicate (anh.)	13.5	544.80
Caustic soda	13.8	735.00
$Na_4P_2O_7$ (TSPP)	10.3	(water softener)

The conductivity at 25° C. of 30 grams per liter, in a glass cell, between two stainless steel electrodes, rigidly secured at 6 volts. Time of immersion 3 minutes.

Alkali	*Comparative Conductivity Figuring soda ash as unity*
Soda ash	1.00
TSP-12 H_2O	0.56
Sodium sesquisilicate (hyd.)	1.44
Sodium metasilicate (hyd.)	1.00
Sodium orthosilicate (anh.)	2.56
Caustic soda	4.11

It is assumed that the SiO_2 adsorbs ions and becomes negatively charged causing it to migrate to the anode. This condition exists in a strongly alkaline bath, it is not true when the solution is made acid. [1]By far the larger percentage of the current is carried to the anode by the OH ion, and only a small part by the SiO_2.

CURVES SHOWING pH vs % NEUTRALIZATION (3% Solutions)



A horizontal line has been drawn at pH-10. It is agreed that little useful work is done between the pH's of 7 and 10, also, the action of soap is impaired in this range.

These curves show that the silicates approach caustic soda in their tendency to resist change of pH when they are used up, as well as possessing remarkable detergent properties.

At this time I would like you to see how the silicates break down in solution, constantly acting as a reservoir of potential cleaner and at the same time maintaining their pH. We shall assume HCl is an acid dirt unit.

$Na_2CO_3 + HCl = NaHCO_3 + NaCl.$

Soda ash has 58% Na_2O, ½ of which is available above a pH of 10. $NaHCO_3$ is a compound with a pH below 10.

$Na_3PO_4 + HCl = Na_2HPO_4 + NaCl.$

TSP has 29% Na_2O, 1/3 of which is available above a pH of 10. Na_2HPO_4 is a compound with a pH below 10.

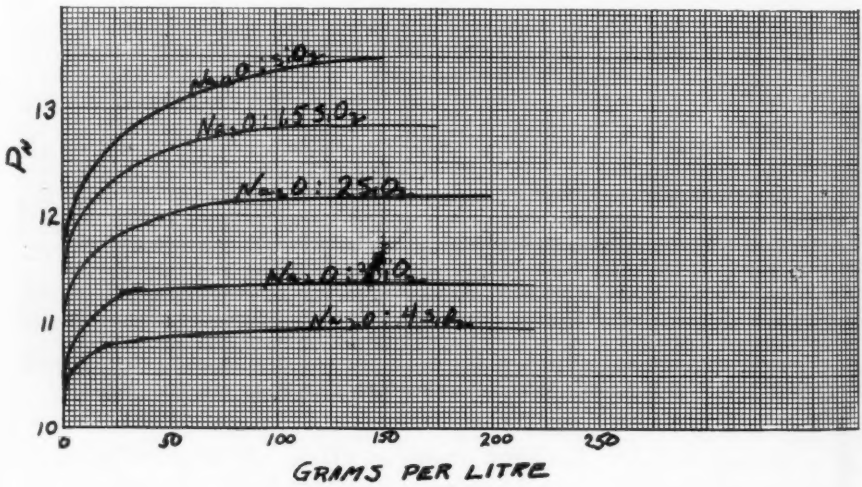
$2\ Na_4SiO_4 + 2\ HCl = Na_6Si_2O_7 + 2\ NaCl + H_2O$

Sodium orthosilicate (anhydrous) has 62½% Na_2O, 90% of which is available above a pH of 10.

$Na_6Si_2O_7 + 2\ HCl = 2\ Na_2SiO_3 + 2\ NaCl + H_2O$

$2\ Na_2SiO_3 + 4\ HCl = 4\ NaCl + (2\ H_2SiO_3)$
$(2\ SiO_2 + 2\ H_2O)$

CHART SHOWING STRONG BUFFER ACTION OF SILICATES AND HOW THEY VARY AS SiO_3 INCREASES[2]



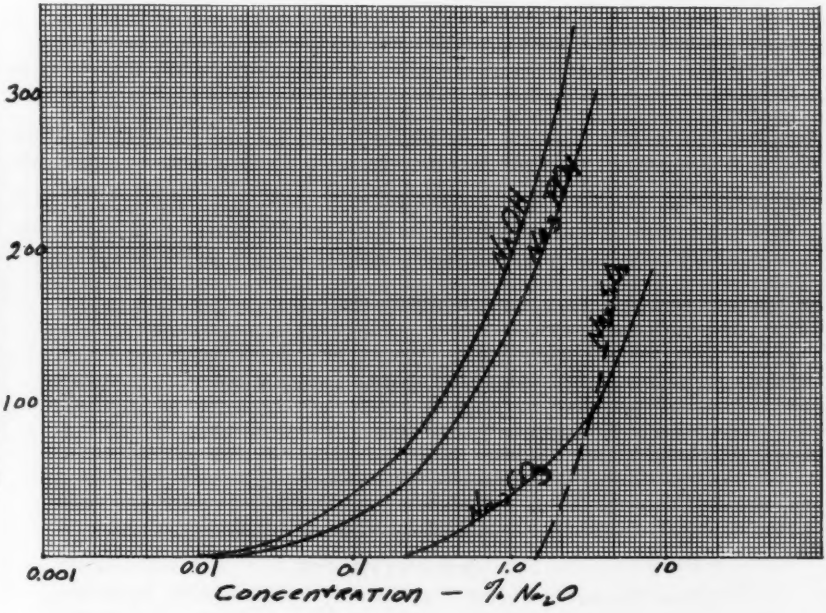
This chart indicates that by picking the proper silicate a wide variation of application can be had. Naturally, the buffered action shown in the above graph would indicate that the silicates are of value in giving uniform results continuously.

The higher ratio SiO_2 silicates are of little value in metal cleaning. Hydrolysis of silicates is best as the Na_2O value increases; it is also best in dilute solutions. In ordinary blending operations, it is difficult to raise their Na_2O value with caustic soda and

produce an easily soluble, attractive mixture. By themselves, if used at the boil, they tend to throw out of solution on the pipes and sides of the tank and may not rinse too freely. They are also bad where there is any indication of hard water. As the ratio of Na_2O : SiO_2 approaches 2 : 1 or goes above this ratio, no trouble is experienced from breakdown through heat or conductivity.

The higher ratio SiO_2 silicates do have a protective action for glass and soft metals and find a wider direct application here.

Following is a chart showing the loss in weight, in grams per square meter of aluminum plotted against the per cent Na_2O of some of the more common alkalies at 60° C. This curve shows that a much more concentrated solution of metasilicate can be used than any other alkali, without experiencing attack.[3]



Perhaps a word should be said about the chemical activity of the silicates. [1]So many substances react with and precipitate silicates that it is almost safe to assume, that a clear viscous solution of water glass contains nothing but silicate alkalies and

water. Examples of precipitants are mineral acids, acid salts; i. e. bichromates, bisulphates, all soluble compounds of metals, (except the alkali metals). Example: zincates, aluminates, plumbates (not chromates or permanganates).

In summing up the outstanding characteristics of the different alkalies we might say that soda ash is cheap, has some water softening ability, is used as a filler (preventing deliquescence in compounds), it has no buffer action, no colloidal action, is corrosive to soft metals, and is used to lower the pH of compounds.

Trisodium phosphate in the commercially hydrated form is cheap but is very weak and ineffective. It has a slight buffering action, no colloidal action and is not as corrosive to soft metals as soda ash.

Caustic soda is a good neutralizer, saponifier and conductor of electricity, but here its value in detergency ceases. Of the alkalies it is probably the most difficult to rinse, and naturally is very disagreeable to handle, as well as being dangerous.

Depending upon the type of work to be done, a silicate may be chosen which in itself presents a much better balance of detergency than any other of the common alkalies. From the foregoing data presented one can readily see that they are most desirable additions to the ordinary cleaning compound. In fact, there are several applications of metal cleaning where some of the silicates need no blending whatsoever to give premium performance.

REFERENCES

[1]Soluble Silicates in Industry—Vail
Chemical Catalog Company Inc., 1928, New York.
Courtesy Philadelphia Quartz Co.
[2]Sodium Metasilicate as an Industrial Alkali—Vail
December 1930, Philadelphia.
Courtesy Philadelphia Quartz Co.
[3]Soluble Silicate Cleaners—Vail
Industrial & Engineering Chemistry, Vol. **28,** March, 1936.
Courtesy Philadelphia Quartz Co. Page 284

APPOINTMENTS

President Goodsell has made the following appointments: Paper Awards Committee—Philip Ritzenthaler, chairman, W. J. Erskine, M. M. Beckwith; Exhibits Award Committee—G. Lewis Smith, chairman, Chester Smith, Ward Hunlock, Vincent Mattocatti, F. Nordam.

THE LEACREST PARTY

The annual spring party at Leacrest, the home of R. L. Leather, president of the Lea Mfg. Co., Waterbury, Conn., will be held on Saturday, May 25.

All platers are invited to attend.

SEE YOU IN DAYTON

Four years ago at New York, the Dayton Branch began its campaign to bring the National Convention of the A.E.S. to Dayton. Last year, at Asbury Park, the delegates finally decided that the best way to get rid of us was to reward our persistence by conferring that honor on us.

We were always of the opinion that staging this affair was a considerable job. At this stage of the game, we are ready to admit it without reservations. However, realizing that we had a big job ahead, the Dayton Committee started its work early last September and since that date there has been no letup in our efforts to make this convention the most outstanding in the twenty-eight years of A.E.S. history.

Now, with final plans being perfected, if we weren't afraid some of our friends would accuse us of being boastful, we would say that we will reach that goal. But, being modest, we shall confine ourselves to conservative adjectives and admit that this 1940 Convention will be colossal.

Seriously speaking, we do invite you to study our educational program, consider our location in the heart of the Midwest manufacturing district, our excellent facilities for housing delegates and visitors, our unexcelled transportation facilities, our outstanding plant trips and, last but not least, the general enthusiasm which has been evident regarding this meeting everywhere we have gone this year.

The Dayton Branch feels that this is a particularly fitting year to act as host, for it marks the Silver Anniversary of the last convention of the A.E.S. in Dayton. We hope to see a goodly number of those who were there twenty-five years ago also present in 1940.

Until June 10, the work of the Dayton Committee goes on and will continue until the last delegate has left "the morning after," June thirteenth.

If you don't believe we mean it, be there and make us prove it!

See you in *Dayton*.

CHAS. C. CONLEY,
Gen. Chairman

A WARNING

Just a word of warning. It would be very easy to be lulled into a sense of security at this juncture which could turn out rather disastrously.

Last fall everyone was sure that prices of all kinds of commodities would go up rapidly. The result was that there was heavy buying simply for price protection. In the main, the expected advances did not materialize, with the consequence that we are now experiencing a slackening of business, due to the fact that

people are using up the excess inventory. We do not consider that it can properly be called a recession when each month is running consistently ahead of the corresponding month of last year, but compared with the latter half of last year, there is a slackening.

The fact that prices did not advance does not prove that they are not going to do so. It is a brave man who makes predictions now as to what is going to happen in the world, and we have no intention of sticking out our neck in any such manner, but we do want to warn you not to be too sure that you know what is going to occur.

This is not an invitation to gamble in inventories. If a man wants to gamble, it is lots more exciting and less wearing to play roulette or the ponies. Unfortunately there is altogether too much unavoidable gambling in business, and all we are trying to get over now is not to take any unnecessary chances under the assumption that because the price advances did not come as scheduled, they are not coming at all.

There are a good many factors in the situation which might bring that to pass. This country has been spending more than it made for many years. It is estimated that the war expenses of England and France are running about fourteen billion dollars per year, and they have only started to fight. It would be impossible for them to raise that amount of money through taxes. The internal economy of the Axis Powers is so clouded that it is hard to know exactly what is happening with them, but it is a certainty that they are not paying as they go. Most neutral nations are nothing but armed camps, with expense beyond income.

Every nation on the globe is fighting desperately to prevent inflation and perhaps they will succeed. On the other hand, if this war continues for any length of time, the odds against their succeeding would look pretty formidable. If the dam bursts anywhere in the world and the flood starts, no one can predict where it will go.

Under the circumstances this is a time to play them close to one's vest, and not shove in one's stack unless one is looking at a royal. In other words, do not take on long-term contracts unless you are in a position to go out and cover on all necessary raw material. Even that is not particularly smart, because no one can tell with certainty what might have to be paid for labor.

During the World War sliding scale contracts were common and we would recommend them to the serious consideration of anyone who feels it necessary to make contracts covering any extended period.

NEWS ITEM

The Lea Mfg. Company of Waterbury, Conn., has been appointed distributor in New England for the line of soft rubber polishing wheels manufactured by The West Co., Inc., Philadelphia, Pa.

Here and There

NEWARK-NEW YORK JOINT MEETING

The second annual joint educational session and social event of the above branches was held at the Hotel Douglas in Newark Saturday, March 30.

President John Kotches of the Newark Branch opened the afternoon session by introducing the supreme officers and other prominent members of the Society. After these preliminaries Paul Oldam was introduced as master of ceremonies. He called on Mr. O. A. Mockridge of the Johns-Manville Company, New York, who presented a motion picture of the Diatom. The other speakers and their subjects, were as follows: Mr. George Hogaboom, Hanson-Van Winkle-Munning Company, "Research"; Dr. R. O. Hull, E. I. du Pont de Nemours Co., "Current Density Range Characteristics, Their Measurement and Application"; Dr. C. B. F. Young, Instititute Electro-Chemistry and Metallurgy, "A Curriculum for Practical Electroplaters"; Dr. Kenneth Graham of A. K. Graham and Associates, Jenkintown, Pa., "Studies of Electrolyte Films."

Approximately one hundred fifty attended the educational session. The members of Newark Branch Ladies' Auxiliary, assisted by some of the New York ladies, entertained their visiting sisters from other branches in the afternoon. Mrs. Horace Smith headed the activities sponsored by this group. The social events of the evening consisted of dancing, entertainment, and a buffet lunch. About 350 attended the Jamboree.

Newark, New York, Philadelphia, and the Connecticut branches were well represented.

Messrs. Fulforth, Downes, and Sievering upheld the dignity of the Supreme Society by being present.

Mr. and Mrs. C. C. Conley came all the way from Dayton to boost the convention. Mr. Conley as general chairman has an irresistible appeal as a booster. He and his committee are worthy of all the support they can get.

Mr. Downes made a stirring speech regarding exhibits for the convention at Dayton. He wound up with a fervent appeal to all present to attend the New England Regional Meeting at Waterbury, April 27.

Freddie Gumm's open house at Kearney in the morning was well patronized. Everyone had a good time.

Rose, who is as prominent at these events as any of the men, deserves a word of commendation. Presiding at the ticket desk, she is always cheerful and courteous. The Newark Ladies' Auxiliary is like that. The young lady mentioned typifies the spirit of the group. More power to the members for their activities in the social functions of the branch.

The Executive Board met with Mr. Conley. Everything seems to be progressing very nicely at Dayton in connection with the convention details.

Our thanks to the committees of both branches for the time and effort spent in providing an afternoon of educational value and an opportunity to get acquainted with each other during the evening's festivities.

BINGHAMTON-SYRACUSE

The regular meeting was held on Friday evening, March 29, at Cortland, N. Y. There was a good attendance considering the snow storms, ice, and rain that have been prevalent in this section for the past month. Here in New England we thought we had more than our share of snow, but from Syracuse to Cortland we saw more snow than we care to describe.

Mr. Norman Prince, Scobell Chemical Co., Rochester, New York, was introduced as the speaker of the evening by George Simmons, the hardworking secretary of the branch. His subject was "Water." The speaker kept the group interested as he told about the various water hardnesses and water pollutions used in plating solutions, which make manufacturers wonder why their plating baths don't function as they should. He closed his remarks by saying that if a

chemist insists on distilled water for making solution analyses, then the plater should be equally as insistent that the purest water obtainable be provided for the making up of plating baths. Mr. Prince used pictures and graphs which made his talk of considerable educational value to the members present.

There was a long discussion after Mr. Prince read his paper, the fact that he gave so many practical experiences gathered in his travels in and around Rochester as he visited mills, plating rooms, and other industrial plants made the speaker's remarks more interesting. Other branches should invite Mr. Prince to speak at their meetings.

Who do you suppose dropped in? None other than our old friend Bert Sage, and did he liven things up? Well, it seemed good to see him. He wanted to be remembered to all his old pals in Boston and "Hawvawd."

We would be ungrateful indeed if we didn't say a word of appreciation for George Simmons. George has done remarkably well as secretary of Binghamton-Syracuse Branch, the boys all like him and value his services very highly. He has to travel from Herkimer to Cortland each meeting night, over a hundred miles, in order to get things going. That's loyalty. Thanks, George, you deserve a bouquet.

There is a sentiment in favor of holding occasional meetings in Syracuse to reach more platers as prospective members. We endorse this plan, and would willingly spend a few days in Syracuse previous to such meetings, visiting plant executives and explaining to them the benefits of membership in the A.E.S.

We were glad to renew acquaintances with the president of the Branch, Mr. Jack Harnett, and other officers and members. We hope it may be possible to visit this beautiful section of New York State when the real beauty of the hills can be appreciated minus snow, rain, and fog.

Bert Sage, his brother George Simmons, and the writer started for Binghamton after the meeting in a downpour. We arrived safely, however, in time to catch the train for Newark to attend the joint session on Saturday. Bert and George were sailors in England. We hope they arrived at their respective homes safely over the week-end, before any bridges were washed out by the rising flood waters.

PROVIDENCE BRANCH

Providence Branch meeting was held on Monday evening, March 18, at the Rhode Island School of Design, with an exceptionally good attendance. The first speaker was William Starr, representing the Lea Mfg. Co. Mr. Starr carefully explained the operating principle of the Magne-Gage, and demonstrated thickness measurements on various samples that were plated.

Mr. Jack Tierney of the Storts Welding Company, Meriden, spoke on the "Influences Affecting the Use of Spray Rinsing Facilities," a detailed account of which may be found in the December 1939 MONTHLY REVIEW. Two types of spray tinse tanks were used in connection with Mr. Tierney's address, the demonstration of which proved very interesting. At the close of the meeting both Mr. Starr and Mr. Tierney were asked many questions as the group gathered round the demonstrators at work in the basement of the school. The highlights of Mr. Tierney's address were the saving of plating production time, lowering alkali and acid costs, saving on water costs, conservation of floor space, minimizing contamination caused by carry over, and lessening costs of waste disposal facilities.

Another attempt is being made to hold a meeting in Attleboro. Several months ago the meeting scheduled was completely washed out by the rain. Better luck next time we hope.

Past President Charlie Chace was the presiding officer. Without being too harsh in our criticism, may we suggest that the newly elected officers be instructed to function in their respective offices during the coming year. When the president is absent, the vice-president's place is in the chair as presiding officer.

Providence Branch owes Charlie Chace a debt of gratitude because of his willingness to serve wherever and whenever the opportunity presents itself.

The Rhode Island School of Design is an ideal meeting place. . . . We missed several of the old-timers. . . . Don Wood, the secretary, got the officers together at the close of the meeting relative to the coming election and—other matters of business.

The membership committee is getting busy. . . . The Branch batting average for obtaining new members has started to pick up. . . . Take it kindly boys, we had a good time and hope to be with you again soon.

PHILADELPHIA BRANCH

The regular meeting of the branch was held on Friday, March 22, at Harrison Lab., University of Penn. Owing to the day being Good Friday, the attendance was not too large.

Dr. Hiram Lukens, member of the local branch and an honorary member of the A.E.S., spoke on the "Mechanism of Conductance." Considerable discussion followed the address, those taking part being George Gehling, Al. Hirsch, Eugene Zurback, Leroy Critchfield, Dr. Sanigar and A. Robson. The time given by Dr. Lukens, and his familiarity with the subject, were fully appreciated. President Joe Underwood in thanking the speaker, said he hoped he would pay a return visit soon.

Dr. E. B. Sanigar, also a member of Philadlephia Branch, was announced as the speaker at the April meeting. The members were invited to visit the plant of the Proctor Electric Company at that time. The invitation was accepted by vote of those present.

In nominating officers for the coming year, it looks as though there will be an entirely new slate.

It is a pleasure to listen to the Quaker City boys engage in the discussions. Everyone, including Dr. Lukens, was good natured and happy.

If Joe Underwood refuses to be renominated as president this year, he should be given something else to do. Joe is too valuable a man to be placed on the retired list.

What a splendid group of members Philadelphia Branch has as speakers: Messrs Lukens, Sanigar, Hirsch, Fulforth, Gehling, Zurbach, Robson, Graham, and E. A. Anderson. These we know—there may be others—anyway the list given is very impressive.

Mrs. Fulforth and Fred entertained us over night. We take this opportunity of expressing to them our sincere thanks.

Phil Uhl was amongst those not present. We missed him. Hope he is feeling well.

President Critchfield of Lancaster Branch hardly ever misses a meeting of Philadelphia Branch. "The tie that binds" is still pretty strong between the members of both branches. Incidentally the membership committee of the Quaker City Branch is filling up the gap made by the transfer of so many members to Lancaster.

Thank you, boys, for a very pleasant evening. We have been told that our presence in Philadelphia is always helpful, especially with the boys who stay out late nights after the meeting. The alibi is "We were showing Bill Kennedy the town."

NEWS ITEM

L. R. Westbrook, formerly assistant director of the Cleveland, Ohio, Experimental Laboratory of the Grasselli Chemicals Department, E. I. du Pont de Nemours & Company, has been appointed research manager of the Company's Electroplating Division. In his new position Mr. Westbrook assumes charge of all electroplating research activities of the du Pont Company. He will continue residence in Cleveland.

PHILADELPHIA BRANCH RESOLUTION

In order to improve the A.E.S. MONTHLY REVIEW, better the arrangement of papers presented to the American Electroplaters' Society for publication, assure greater opportunity for full discussion of papers presented at the annual conventions, avoid duplication of copy, and, finally, to help electroplaters write more papers on the practical applications of electroplating; be it resolved that Article IV of the By-Laws of the American Electroplaters' Society be amended as follows to establish a Publications Committee:

Publications Committee:

A vice-president shall be chairman of and appoint the publications committee consisting of the Executive Secretary and three other members of the society.

The committee shall pass on the acceptability of all papers offered for publication in The MONTHLY REVIEW or for presentation to the annual convention and shall have sole authority to accept or reject papers, provided, however, that any member may appeal to the Executive Board against any decision of the committee in respect to a paper submitted by that member.

The committee shall review and edit all papers at the earliest possible date and offer to the writers thereof such helpful suggestions and criticisms as will lead to more interesting papers. The committee is empowered to submit papers to any society member, who is a competent critic, for his opinion.

The committee shall establish and announce a final date for acceptance of copy for the annual convention; limit the amount of material accepted for convention programs consistent with the length of program desired; and prepare and distribute preprints of convention papers to interested members sufficiently in advance of the convention meeting as to allow preparation of intelligent discussion.

March 27, 1940

Mr. W. J. R. Kennedy
93 Oak Grove Ave.,
Springfield, Mass.

Dear Mr. Kennedy:

By authority of the Members of the Supreme Society in our Branch, and the Branch itself, the following is to be published in both the April and May Issues of The MONTHLY REVIEW.

Amendment to
Article 2
Section 3: Honorary Members.

This membership shall only be conferred upon applicants who have been members in good standing for five years, and whose knowledge and service have added or will add to the general standing and welfare of the Society. Admission to be by majority vote of the Supreme Society at Annual Meetings. Any Branch desirous of having any member elected to Honorary Membership in the Supreme Society, shall submit the name of such person to the Executive Secretary before the first of April, together with appropriate history for qualification, both of which shall be published in the April and May issues of the REVIEW.

In our opinion, this new section is much clearer than the present one, furthermore the provision making it necessary to publish the name and history of applicants in both the April and May issues of The MONTHLY REVIEW will enable all delegates to familiarize themselves with the history in each case and be able to vote intelligently on each applicant at the Conventions.

This suggestion to strike out the present Section in the Constitution and to adopt the new one will be brought up at Dayton Convention by our delegate or proxy as the case may be.

Very truly yours,
RAYMOND SOLIVAN, *Secy.-Treas.*

PROPOSED AMENDMENT TO ARTICLE II, SECTION III HONORARY MEMBERSHIP

Grand Rapids Branch of the A.E.S. feels that in the matter of honorary membership undue emphasis has been placed on the old age rather than on the other qualifications of proposed candidates.

We, therefore, propose that the following limitations be made to Part I, Article 2, Section 3 of the constitution: That the number of honorary members be limited to 10.

(Signed) CHARLES WHALLEY
Secretary, Grand Rapids Branch

February 10, 1940

AMENDMENT TO ARTICLE II, SECTION II

In order to clear up a misunderstanding in the minds of some of our members regarding Article II, Section II, Page 1, of the Constitution and By-laws which reads: Membership. Active Members. "These shall consist of three (3) active members in good standing from each branch Society that is in good standing, who have been elected by the Supreme Society in the manner required in the By-laws. Each elected officer of the Society must be elected by his branch as a delegate."

Springfield Branch has voted to amend the last sentence of Section II to read as follows: "Each elected officer of the Society must be returned by his branch as a delegate."

(Signed) DERICK S. HARTSHORN
Secretary, Springfield Branch

March 25, 1940

This young man is Mr. Charles H. Proctor of Clearwater, Florida, founder of the American Electroplaters' Society. Mr. Proctor was seventy-four on February 25 and keeps active in doing things, constantly developing new products. Mr. Proctor's photo was taken near the Gulf of Mexico, January 31, and was mailed to Mr. Charles Conley of Dayton.

The International Fellowship Club

BY JOHN C. OBERENDER
Zapon Division Atlas Powder Co.

With the approach of the American Electroplaters' Society's yearly convention at Dayton, Ohio, a few words concerning the International Fellowship Club could not better be expressed, both as to time or place. In Mr. Frank J. Clark's article on the International Fellowship Club in April, 1939, he outlined the two main objectives of our organization; namely, the social and sales angles.

I feel that in all my years of connection with the International Fellowship Club the ideas and aims of the Club have been loyally

JOHN C. OBERENDER

carried out; that we have attained our objectives I feel there is no doubt.

The International Fellowship Club is truly an anomaly. It does not collect dues of any nature, but it pays probably the largest dividends of any organization of its kind. These dividends

are not payable in cash, but anyone may see these dividends being paid in the form of friendships founded on the respect that suppliers and users of the products our members sell have for one another. Dividends are paid on increased understanding of our personal and business problems by our friends and members, and above all can we realize that these dividends are a concrete fact when, at the International Fellowship Club's Open House traditionally held on the first day of the American Electroplaters' Society's convention, one may see the friends who gather together after a long period to welcome one another and to renew these friendships. It seems to me that no organization can ask or be asked to do more, and I feel that the fact that anyone is associated with the International Fellowship Club can be truly said to be the the hallmark of authenticity in both personal and business dealings.

The International Fellowship Club truly meets in its entirety but once a year, but this meeting is one that is remembered during the period of time elapsing until the subsequent annual meeting by all who attend it, taking away a feeling of good comradeship and growing respect for its aims and accomplishments.

The International Fellowship Club was started by a very small group of men, and it takes work to carry it on, but it is the very aims and ideals of this organization that automatically keep it not only in existence but in a state of perpetual growth. This is not a mushroom growth but one based on solid facts and firm foundations, and one which will endure for many years to come.

To all our members and friends I express the hope that the forthcoming Open House will see the largest attendance yet registered, and that future years will show an ever increasing attendance, and with it a greater knowledge and understanding if our many activities.

WING YOUR WAY TO DAYTON, THE BIRTHPLACE OF AVIATION

NEWS ITEM

The Lea Manufacturing Co., Waterbury, Conn., has been appointed New England distributor for the Aminco-Brenner Magne-Gage, manufactured by the American Instrument Co., Silver Spring, Maryland. The Magne-Gage is an instrument for accurately and rapidly measuring local thicknesses of metallic or organic coatings on metal surfaces without destroying or injuring the coating or the base metal.

A LETTER FROM BERT SAGE

The editorial that appeared in the March issue of The MONTHLY REVIEW regarding the effects of stainless steel and other alloys, plastics, and synthetics on the future of electroplating, should be viewed seriously, and some worthwhile comment should be obtained as to the actual inroads made by these materials.

I remember discussing plastics with one of our honored members a few years ago, when he was of the opinion that plastics and plating were complimentary to each other—I hope his opinion is still the same, although I am inclined to take a more pessimistic viewpoint.

To say the least, those who are concerned with the manufacture and fabricating of plastics are very enthusiastic as to its future and should their enthusiasm bear fruit, it is obvious that many established industries will feel the pressure of this competition. There is much to be said in favor of plastics: its adaptability to color schemes, the intricate shapes and forms into which it can be made, and perhaps, too, a certain glamor in its particular eye appeal.

To illustrate further, I would refer you to the March 25th copy of *Life* where is pictured among other things, a table set for a meal, on which none of the traditional tableware is present, the entire setting being of plastic origin. A survey of drug stores and other novelty shops where plastics abound also gives a wide outlook on what is being accomplished.

Regarding alloys, it seems obvious to me that should plastics make drastic inroads into the metal trades (as those in the plastic industry hope) the steel mills, brass foundries and diecasters will turn their research facilities toward the development of alloys that will tend to offset these inroads, while we of the plating fraternity will go conservatively on our way, hoping for the best. This, perhaps, is quite in order, providing we improve the means of expressing our art, consolidate what we have, and realize we are far from perfect.

I have certain specific cases in mind as, for example, the automotive industry which is so often mentioned as an illustration of the life value of properly applied electroplated coatings. I have one of these new nationally known cars on which the chromium is simply "not there" in several spots, because of improper racking. I have also seen two other new 1940 cars which, for some reason or other, have developed a serious case of rusting in the short period they have been on the road. Conditions of this kind do not do justice to the work that has been done by interested parties to perfect conditions of service from plated products, and certainly does lay low our "ego" when we discuss competitive materials. The public does not understand exceptions to the rule. All the individual buyer knows is that he has not received value for his investment and so naturally he complains. The engineer—to whom the complaint is finally referred—wonders if he cannot avoid these petty complaints by making those parts on *next* year's car from stainless steel or some such alloy.

I agree with our Editor that there should be some way to determine the actual trend of the plating business. This could be accomplished by a compilation of anode sales, for it is obvious that, were there any real proof of a continual drop in anode sales, we would show concern and endeavor to do something which would stimulate interest in plated products.

During the week, while listening to a news broadcast, I had the thrill of hearing one of our own supply houses quoted on the stock market as being up a fraction of a point. Not being familiar with these things, other than up is up, I wondered if this particular house had sold more anodes or had found another outlet for plating equipment.

Being an enthusiast regarding the value of properly applied electrodeposits, I hope to see the day when the quality of plated products is judged and determined by their various trademarks and the insignia, "A.E.S. Approved" is as popular as "Bodies by Fisher" and "Approved by Good Housekeeping." That should be our aim, and when something of that nature becomes a fact, then we will have little to fear from competitive materials.

BOSTON BRANCH'ANNUAL MEETING

It has been our good fortune to attend nearly all the annual meetings of the branches this year having Educational Sessions and banquets, but none of them surpassed the fine program at the Statler on Saturday, April 13, under the auspices of Boston Branch. Good natured Arthur Mintie was introduced as the chairman of the meeting by President Edward C. DeLorme and as usual Arthur was equal to the occasion. Robert Sizelove of the Frederick Gumm Chemical Co. was the first speaker introduced, his subject being "Trouble Shooting." Bob presented his paper well, and answered many questions during the discussion. Myron B. Diggin of the Hanson-Van Winkle-Munning Co. chose as his subject "Ductile Nickel Deposits and Semi-Bright Nickel Baths." This paper created considerable interest, many out-of-town persons coming to hear and discuss with Mr. Diggin the contents of the paper.

Two of our familiar friends followed: Mr. Ed Rinker who gave a most interesting address on "Cleaning Before Electroplating." and Mr. N. C. Promisel, International Silver Co., who talked on "Electropolishing." This presentation of an entirely new subject to platers was listened to with rapt attention. Mr. Promisel's easy delivery, combined with the use of pictures, plus his evident familiarity with the subject, wound up a most enjoyable and instructive Educational Session that ranks with any we have attended this year.

At the conclusion of the meeting several prominent men were introduced, including Walter Meyer, editor of *Metal Industry*, Past Supreme President John Feeley of Montreal, Joseph Downes, second vice-president of the Supreme Society, and Francis Mackie, former president of Boston Branch. A letter was read from Mr. Charles Conley, chairman of the Dayton Convention Committee, expressing regret at not being able to be present, but inviting all to make a special attempt to come to Dayton for this year's convention. John C. Oberander of the Zapon Company read Mr. Conley's letter. The banquet, floor show, door prizes, etc., were all that anyone could desire.

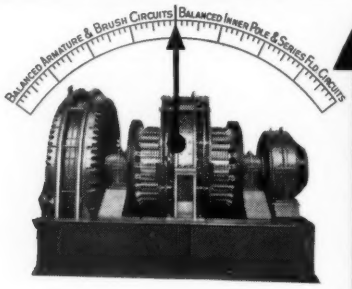
Congratulations, Joe Barron, for the program of over eighty ads. . . . With Joe on the program committee were Arthur Collins and Andrew Garrett. . . . Thanks also to Miss Ann Baker who had charge of the Ladies' Reception Committee. . . . It's too bad the weather was unfavorable for outdoor sightseeing, but the girls had a good time just the same. . . . Who should drop in but our old friend from Montreal, John Feeley. . . . No one is more welcome where platers meet than this Connecticut-born Canadian. His honesty, ready wit, and ability to keep his head in times of stress endear him to all who know him. John served notice on the Boston boys that they are going to have competition for the 1941 convention. . . . Arthur Mintie remarked that there was no opposition when the convention was invited to Canada during prohibition. . . . Another visitor we were pleased to see was John T. Rooney of Spencer Lens Co., Buffalo. Mr. Rooney is a member of Buffalo Branch. . . . The Connecticut boys turned out in fine shape. . . . Providence and Springfield didn't do so badly either.

Bill Cahill and Don Wood, Jack Costigan and Derick Hartshorn represented Providence and Springfield branches officially. . . . The crowd was anxious to see the Skating Comets give Charlie Hardy a ride, but Charlie was "agin it.". . . Francis Mackie "the grand old man of Boston Branch" gave a fine resumé of plating experiences. He also said some wise things about the REVIEW.

More than 300 sat down to the banquet, about 125 attended the educational session. Should the convention delegates vote in favor of Boston as the 1941 convention city, we do not hesitate to say that the prospects of the best convention ever held are excellent. Judging from the enthusiasm already manifested the Hub committees are "rearin'" to go. If the annual meeting just held is any criterion, the success of next year's convention is already assured.

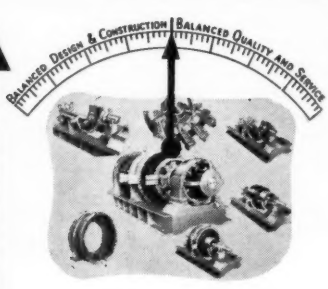
WING YOUR WAY TO DAYTON, THE BIRTHPLACE OF AVIATION

"BALANCED" LOW VOLTAGE GENERATORS FO



BALANCED CIRCUITS

H-VW-M balanced circuits are an exclusive feature and a real step forward. Modern low voltage generators of double commutator construction require carefully and accurately planned electric circuits to secure the proper balance of load between the commutators and in the fields. This alone gives best voltage regulation and perfect commutation. H-VW-M balanced low voltage generators are unequalled in these characteristics.



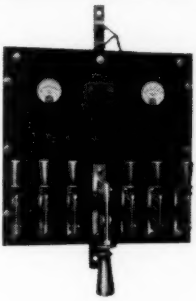
BALANCED MANUFACTURE

Over 50 years' continuous advancement in the production of H-VW-M low voltage generators has resulted in a world-wide, well earned reputation for quality, long life, high efficiency and low cost of maintenance. The use of the best materials, careful workmanship, and proper inspection assures such correct electrical and mechanical features that H-VW-M generators have become known as the "standard of the plating industry."

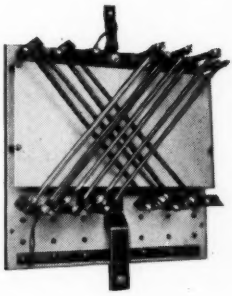
HANSON-VAN WINKLE-MUNNING CO.
MATAWAN, NEW JERSEY

FORM "A" TANK RHEOSTATS

H-VW-M Form "A" Tank Rheostats are well designed, strongly built and have many outstanding features. A maximum number of steps of control are available and operation for rated voltage drop at current load is simple. There are no castings of any kind to break and all parts are carefully selected to meet required needs.

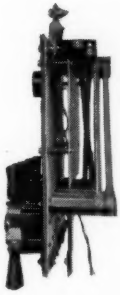


Mounting—heavy, fireproof asbestos panels are used with steel cases to support panels and enclose resistors.



Resistors—strip type Nichrome with four times the radiating surface of usual helical wire coils.

Switches—specially designed, heavier and shorter, and 50% oversize in comparison to standard knife switches.



Heating—switches are protected from heat of coils by a baffle between resistors and panel and by mounting resistors on special supports having a low heat conductivity. Baffle and outside case with openings at top and bottom provide chimney-action of upward flow of cool air. Diagonal resistors also provide greater heat distribution to give maximum cooling.

Business and Social News

BRANCH NEWS

Educational Activities

AMERICAN ELECTROPLATERS' SOCIETY

Pittsburgh Branch met Friday evening, March 1, at the U. S. Bureau of Mines.

Our president, Mr. S. E. Hedden, is confined in the Presbyterian Hospital with the flu, and Mr. Herman Peter, our vice-president, is vacationing in Florida.

Mr. Richard Dimon and Mr. Donald Shantz were appointed as a committee on exhibits to be shown by the Pittsburgh Branch at the Dayton Convention.

Mr. R. L. Lunt of Alloys Plating Laboratories gave the introduction of a talk on "Invention and Electroplating." Mr. Lunt gave the history of invention and how present electroplating is dependent upon the invention of the printing press by Gutenberg, the principle of combustion, the introduction of chemical symbols by Berzelius, the discoveries about electricity by Ohm, and the electrical laws discovered by Faraday.

Mr. B. C. Case of Hanson-Van Winkle-Munning Company presented an excellent paper on "Bright Nickel Deposits." He dwelt in detail on the value of purifying the plating solution both at the time of conversion of dull to bright nickel and during operation after the solution is converted. This is necessary in most cases because the bright nickels are not as tolerant to impurities as are the dull nickels.

Purification consists of removing organic impurities by filtering and metallic impurities by plating at low current densities. The proper procedure for filtering is to use filter paper on top of filter cloths and build a cake of filter aid and bentonite and activated carbon. One-half to one ounce per gallon of bentonite and activated carbon will remove organic impurities from a solution best at 150° to 160° F. Selective plating out of metallic impurities is done at current densities of from two to six amperes per square foot. A correctly shaped cathode will plate out all of the impure metals. Copper will plate out at one to two amperes per square foot and lead, iron, and zinc will plate out at correspondingly higher current densities. Plants plating on tubes often find such a build-up of metallic impurities due to the inside of tubes being anodic that they install a small auxiliary tank to remove heavy metals on dummy cathodes. Lead coils as heating units should be placed in back of the anodes or given a slight cathodic current to prevent them from building up lead in the solution. Centrifugal type air compressors should be used for air agitation since high pressure air compressors introduce oil and cracked oil products into the solution.

Mr. Case dealt mostly with the cobalt-nickel type of bright nickel solutions in his talk. The formulas of these solutions are:

18%	Cobalt in nickel anodes	1%
32 oz./gal.	Nickel sulphate	32 oz./gal.
6 oz./gal.	Nickel chloride	4 oz./gal.
4 oz./gal.	Boric acid	4 oz./gal.
2.0 oz./gal.	Cobalt sulphate	.35 oz./gal.
.33 oz./gal.	Formaldehyde	.33 oz./gal.
.33 oz./gal.	Ammonium sulphate	.10 oz./gal.

In One—Or a Hundred—Or a Carload—
The Cost-Cutting Features Are the Same.

You'll find the same money-savings utility and functional features in every "Vortexeddy" Spray Rinsing Tank, regardless of the size you order . . . and when you order one and use it, you'll order additional ones for the same reason — TO CUT COSTS AND INCREASE PROFITS.

YOUR NEAREST UDYLITE OFFICE WILL GLADLY AND PROMPTLY SERVE YOU

●

THE UDYLITE CORP., DETROIT, MICH.
The Udylite Corp., Chicago, Ill.
The Udylite Corp., New York, N. Y.
The Udylite Corp., Cleveland, Ohio
J. C. Miller Co., Grand Rapids, Mich.
Donald Sales & Mfg. Co., Milwaukee, Wis.
L. H. Butcher Co., San Francisco, Cal.
L. H. Butcher Co., Los Angeles, Cal.
MacDermid Inc., Waterbury, Conn.
Electroplating, Inc., Atlanta, Ga.
F. H. Bathke, St. Paul, Minn.

●

In the first six months of marketing, more than 30% of users of "Vortexeddy" Spray Rinse Tanks reordered additional tanks shortly after using the initial one.

Every "Vortexeddy" Spray Rinse Tank you order will furnish you the same cost-cutting features for your plating operations. Your gains are definitely assured.

●

A BOOKLET TELLING WHY IS YOURS FOR THE ASKING—SEND FOR IT NOW.

●

STORTS WELDING COMPANY

MERIDEN CONNECTICUT

5.0 oz./gal. Sodium formate
0 oz./gal.
0 oz./gal. Nickel formate
6.0 oz./gal.

Mr. Case then told of how he became interested in bright nickel as the result of trying to eliminate pits in dull nickel. He described nickel as plated from the ordinary dull bath as being of conical structure and nickel plated from cobalt-nickel baths as being columnar structure.

After a discussion on the value of various buffers by Dr. Gus Soderburg and Mr. Case the meeting was adjourned.

The next meeting will be held Friday, April 5, at the Bureau of Mines at which time Mr. J. S. Nachtman will be the guest speaker.

FRANK R. KELLER, *Secy.*

Wing Your Way to Dayton the Birthplace of Aviation

Detroit Branch A.E.S. held its March meeting on Friday, March 1st, at Hotel Statler.

Invitations were received from Milwaukee and Newark-New York Branches to attend their respective educational sessions.

A nominating committee was appointed to select candidates and report for the April meeting when election of officers will take place.

Mr. H. Leroy Beaver, of the Abbott Ball Co., Hartford, Conn., told us about "Methods of Barrel Finishing." To those without barrel finishing experience, the subject sounded uninteresting, but Mr. Beaver's method of presenting facts and experiences kept everyone attentive. The display that Mr. Beaver brought with him showed the progress made in finishing, and he was kept busy explaining after the the meeting was adjourned.

Divine
COMPRESS
POLISHING WHEELS
Finer finishes—
at lower cost
Divine Brothers Company
62 Whitesboro St., UTICA, N. Y.
Quality Products Since 1892

The next meeting of Detroit Branch will be held April 12th with Dr. Blum, of the Bureau of Standards as the speaker.

WRIGHT WILSON, *Secy.*

Newark Branch met Friday evening, March 1, at the Club Room of the Hotel Douglas, Newark, N. J.

A letter was read from The Picatinny Arsenal relative to hazards and methods of exhausting fumes from Electroplating processes. Applications of Mr. William P. Catucci and Mr. Louis E. Gehm to Associate Membership were received. Transfer for Mr. F. Erlenmeyer from Rochester Branch to Newark Branch was accepted.

The Secretary reported that final arrangements for The Newark-New York Educational Session and Jamboree were being completed. We were honored by the presence of our Execu-

tive Secretary, Mr. W. J. R. Kennedy who was called upon for some remarks. Mr. Kennedy extended an invitation to the Newark Branch members to attend the New England Regional Session on April 27, 1940. Mr. F. J. MacStoker and a delegation from New York Branch were also present at this meeting.

Mr. Paul Oldam, our Librarian, then presented the guest speaker of the evening, Mr. William Schneider of E. I. du Pont Nemours Co., who after telling us the story of how he acquired the name of "Cyanide Bill," gave a very interesting talk on "Moly-Black." He exhibited numerous samples finished in Moly-Black and presented everyone who attended the meeting with a du Pont Moly-Black ash tray and a pamphlet giving full particulars on this finish. Mr. Schneider was given a rising vote of thanks by the seventy-seven members who attended this meeting which adjourned at 11 P. M.

GEORGE WAGNER, *Secy.*

Toronto Branch met at the King Edward Hotel March 1, with President Acheson in the chair. He introduced Mr. W. A. Irvine from the Ward Street Plant of the Canadian General Electric Co., as guest speaker of the evening, his subject being "Vitreous Enameling." Our Secretary Allen Byres came in with a broken arm and said it was done while skiing, but that he was still able to carry on. Sorry, Allen. Letters were read from Mr. Kennedy, Joseph Downes and Mr. F. Smith; two reinstatements and the application of Mr. Arthur Severs were voted on. Not bad for the Jack Walker-John Acheson combination. The activities of the Branch being a well-filled program for the next three months, it was advisable to hold elections for the next fiscal year. Mr. Archie Smith was elected president; Jim Graham, vice-president, Allen Byres reelected as secretary-treasurer, and Bill Price, librarian, with Jack McLean, Charlie Kemish and Colin Turner, trustees. The surprise of the evening was the appearance of Martin Phillips and Martin Robinson. Perhaps they wanted information about Dayton.

Harry Bird must be working a lot of overtime or playing Bingo.

Buffalo members are to pay the Toronto Branch a return visit on the first Friday of April. Come on, Buffalo, the roads are good and we are waiting.

Mr. Irvine in his talk covered the early history of Egyptian enameling and lacquers, following through and coming to the present-day production of vitreous enamels. It was also interesting to learn from him that vitreous enameling was done in Scotland some seventy-five years ago but never was at

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the peak of production that it is today, and although, he said, there was still much to learn yet. The steel used is a special sheet iron, which does not warp or get out of shape. Eleven samples of enameling were passed around to the thirty-two members present, together base metal, cleaned and pickled, and the ingredients or pigments used.

One member asked to know if this could be used for the insulation of rack and Mr. Irvine stated that copper and brass racks would not stand the 1600 degrees of heat required. Mr. Irvine answered many other questions and received a hearty vote of thanks from the members with the usual invitation from our president to "come again."

Later discussion concerned the card party on the 21st, and how far it is to Dayton.

J. S. CAIRNS, *Secy.*

Wing Your Way to Dayton
The Birthplace of Aviation

Rochester Branch held its regular monthly meeting Friday March 15. The meeting was very well attended and as we had no guest speaker for this meeting we had a round table discussion in which everyone joined. The committees for the annual meeting made their reports and everything is coming along in fine style. We want everyone to remember the date for the 20th Annual Educational Session and Dinner Dance of this Branch to be held at the Seneca Hotel on Saturday, April 27. Try to attend. It will be well worth your time.

After the reports and discussions the meeting was adjourned.

JUDSON ELSTER, *Secy.*

Lancaster Branch of the A.E.S. held its second monthly meeting on Friday, March 8, at Franklin & Marshall College. The meeting was attended by fifty-three members and guests.

Six active and nine associate members were elected and four applications were received.

President Critchfield read the list of members who were appointed to serve on the various committees:

Membership—W. R. Klunk, J. Leitner, C. E. Snyder; Entertainment—M. P. Gross, T. Schwalm, J. Mylin; Finance—C. E. Brubaker; Educational—C. M. Elslager, R. Etter, H. E. Brubaker; Publicity—R. E. Shay, H. L. Hovis, N. Gebert.

It was voted to have an exhibit from our Chapter for the National Convention at Dayton, and a committee will be appointed.

Following business the librarian introduced the speaker of the evening. Mr. L. E. Sullivan of the Divine Brothers Co., Utica, New York, whose

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subject was "Polishing and Setting up Wheels." Mr. Sullivan very capably discussed various types of glues and wheels and pointed out the several factors which contribute to successful polishing. The lecture was received with much enthusiasm and provoked a very lengthy discussion.

The meeting adjourned at 10:20 P.M., however a post meeting discussion continued for approximately an hour longer.

H. L. HOVIS, *Secy.-Treas.*

Grand Rapids Branch held its regular monthly meeting February 14, and was called to order by President Chas. Werft. Minutes of the previous meeting were read and approved. Communications from W. J. R. Kennedy and A. J. Hermansen were read and accepted. The applications of Harry Don Burgess and Walter E. Moline were favorably acted upon. Mr. Smith read two communications relating to finished hardware products to be exhibited at the Dayton Convention. After discussion as to whether we would repeat with the products of a year ago or secure a new set of samples, the latter carried.

The following members were elected to office for the coming year: President, Maurice Caldwell; vice-president, Chester Smith; secretary and treasurer, C. E. Abel; librarian, Stewart Martin; board of managers, Axel Rickson, Ivan C. Hepfer and F. D. Pace. Librarian Smith then introduced the speaker of the evening, Mr. H. Leroy Beaver.

Mr. Beaver reviewed the early history of barrel finishing and the origin of various types of barrels. A point of interest was his discussion of finishing by action of impingement as compared to proper burnishing. The necessary point of cleanliness was stressed. "Work to be burnished should have the same faultless cleaning as work to be plated." Care of the burnishing material is necessary to insure consistently good work. Rusted and pitted burnishing material will scratch the surface of the metal. He stated the best way to leave the burnishing material was in a solution of alkali and soap.

Pitted or rusted balls can be renovated by tumbling in a steel barrel with a mixture of Vienna Lime and water until the roughened surface is polished smooth. Damaged burnishing materials may be returned to the manufacturer for renovating at a slight cost per pound. The use of cream of tartar, molasses, etc., for burnishing compound was not to be recommended. The action of such compounds is harmful to steel balls. The best compounds are modified soaps of around 42 titre.

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necessary to soften the water. Mr. Beaver gave a simple method of softening: Add 1 ounce of T.S.P. per 100 gallons of water, per one grain hardness. Then add the prescribed amount of soap. This is a more economical method of softening than to add soap. If the suds do not remain one minute, the water is not properly softened and it is impossible to get successful burnishing jobs this way.

Mr. Beaver showed many interesting samples of plastics and various types of burnishing materials and compounds. A great deal more information was brought out in the questions that followed, and Mr. Beaver proved himself a master of this subject.

It was announced that Dr. Blum of the U. S. Bureau of Standards would be present for the next meeting on April 11.

CHAS. S. WHALLEY, *Secy.-Treas.*

Wing Your Way to Dayton
The Birthplace of Aviation

Hartford Branch of the A.E.S. met on Monday evening, March 18, at the Hotel Garde.

Prior to the meeting a very delicious supper was served in the Garde dining room, and was attended by twelve members as well as the speaker of the evening, Dr. Walter Meyer.

The meeting was called to order at 8:30 P.M. with President Backus in the chair. Upon motion and seconded, it was voted to suspend the regular business meeting, this to be held at a special meeting later, and turn the meeting over to the librarian and the speaker of the evening.

Dr. Meyer gave a very excellent talk on "Recent Developments in Zinc Plating." He discussed at some length his own personal observations of a research nature as well as some of the actual shop experience that he has had.

Dr. Meyer was kept talking and answering questions to a late hour, and in conclusion he was given a rising vote of thanks.

The meeting was attended by forty-four members and visitors and was adjourned at 11:00 P.M.

V. E. GRANT, *Secy.*

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Acid:	*Alkaline:*
pH 5.2—6.7 (nickel)	pH 6.6— 8.1
3.6—5.0 (nickel)	8.2— 9.7
3.7—5.3 (zinc)	9.2—11.0
1.9—3.4 (copper, nickel)	(brass, copper, silver)
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Los Angeles Branch of the A.E.S. held its regular monthly meeting March 13, at the Rosslyn Hotel in downtown Los Angeles. President Ray Bray called the meeting to order at 8 P.M. and introduced the guest speaker of the evening: Dr. John P. Russell, M. D., Chief Industrial Hygiene Service State of California, Department of Public Health.

Dr. Russell's talk described the relation of the Hygiene Service to the industries in the state of California.

This service operates in a consulting and advisory capacity. It is available to employers who have problems of a hygienic nature.

Dr. Russell's talk covered the symptoms of various types of industrial poisoning. In connection with health hazards resulting from exposure to toxic chemicals, the following may be regarded as threshold limits:

Carbon tetrachloride
100 parts per million parts of air
Benzol
50 parts per million parts of air
Lead
1½ mg. per 10 cu. m. parts of air
Cadmium
1 mg. per 10 cu. m. parts of air
Chromic acid
1 mg. per 10 cu. m. parts of air
Mercury
1-2 mg. per 10 cu. m. parts of air
Freshly oxidized zinc oxide
15 mg. per cu. ft. parts of air
Hydrocyanic acid
100 parts per million parts of air

Ten cu. m. is approximately the volume of air passed through the lungs of a man working eight hours.

Silicosis is caused by the free silicate that reaches the lungs. Particles greater than ten microns do not reach the lungs. Silicosis requires five years to develop. There is no known cure. The need for segregating dust-producing operations and for local exhaust ventilation was stressed.

Carborundum, which is a silicate dust, can cause silicosis but is not as predisposed to lead to tuberculosis as is free silica. Chromic acid has no effect on the unbroken skin. Points of entry may be through the skin on the knuckles, between the fingers, or the septum of the nose.

The plated metals are frequently not as poisonous as the impurities which they carry. Among these were listed arsenic, lead and mercury. Lead and mercury are regarded as cumulative poisons. In the spraying of lacquers and enamels, the type of pigment is not as important as the solvents used. The composition of the paints should therefore be known.

Mr. Rock J. Chartrand of the L. H. Butcher Co., Los Angeles, and Mr. George H. Otters of the Department of Water and Power were elected associate members.

RAYMOND SOLIVAN, *Secy.-Treas.*

Providence-Attleboro Branch was particularly fortunate in having Mr. Jack Tierney of Storts Welding Co. and Mr. Earle Couch of The Lea Mfg. Co. on the same program for the meeting of March 18. This was an open meeting held at the Rhode Island School of Design where facilities were made available to adequately demonstrate the

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"Vortexeddy" Spray Rinse by Storts and the "Magne-Gage" distributed by Lea. Much interest was expressed in both pieces of equipment and a very satisfactory meeting resulted.

The presence of Bill Kennedy lent a pleasant note and his reports and forecasts of the Dayton convention were most welcome.

Before the meeting a small group had supper at the Narragansett Hotel. For the benefit of absent members this has come to be a monthly, if unofficial custom, and a highly enjoyable part of the meetings.

Following the meeting the Board of Managers met briefly to elect three new members: George M. DeCamp, Pierre B. Lonsbury, and Walter L. Larson.

The Board also decided to support Boston in its request for the 1941 Convention, to appoint Mr. Mark Weisberg chairman of an exhibits committee for the Dayton Convention, the balance of committee to be appointed by Mr. Weisberg. Membership in the branch is increasing satisfactorily.

DONALD WOOD, *Secy.*

Boston Branch met Thursday the fourth at the Manger Hotel, Boston, with President DeLorme in the chair.

Letters were read from Bridgeport and Providence Branches giving their support to Boston Branch for the 1941 convention. The application of Harlan M. Gale, Brookline, Mass., was received. The banquet committee made its last report and a very fine time with floor show, door prizes, dancing and a large attendance is expected.

President DeLorme in the absence of our librarian introduced Earl Couch who spoke of the coming New England banquet at Waterbury, the twenty-seventh. Boston will be there strong. William Store, speaker of the evening, gave a very fine demonstration of the Magne-Gage machine for "a rapid and non-destructive method of measuring local thickness of coatings on metals." It will measure the thickness of metals such as nickel, brass, zinc, and chromium on steel with speed, accuracy, and is easily operated. He had some samples with him and the members brought others to be tested. He was given a rising vote of thanks for his interesting talk.

A general discussion continued until 10.30 after which the meeting adjourned.

A. W. GARRETT, *Secy.*

Cincinnati Branch met Thursday evening, March 28, at the Hotel Metropole.

Mr. O. T. Towner and Mr. Harry Misner were appointed to act on the Exhibits Committee for the 1940 Con-

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vention at Dayton, with Mr. Joseph Adler as chairman.

The secretary was instructed to write Mr. H. C. Leuchauer, of the Dayton Branch stating that a paper would be presented for his approval to be read at the Convention by Mr. Owen T. Towner, the title to be "Pickling of Metals for Electroplating."

One of our prospective members, Mr. H. E. Nice, entertained us at our meeting with comments on bright nickel plating and his hobby of "wetting agents," also his description of a "bubble bath."

Mr. Fred Vogel gave the branch a pleasant surprise by announcing that a paper, "The Finishing of Die Cast Products," which had been presented before this branch by Mr. Towner, had been reprinted by the *Metal Industry* of London, England.

MARTIN GANNON, JR., *Secy.*

Wing your way to Dayton the Birthplace of Aviation

Toronto Branch. The platers, luncheon and card party was held on March 21 in Malhoney's Art Galleries with the attendance of one hundred four platers and their friends all trying to win prizes donated by the platers and their employers, the thirty-six prizes including plated table lamps, fry pans, electric irons, roller skates, silk cushions and silverware. The highest points of the game had the first choice and so on down the line with some of the old prize winners such as Charlie Kemish, Harry Bird and J. S. Cairns being disappointed. What happened is best known to the winners. They must have caught on. The evening came to a finish with chicken patties, green peas, etc., coffee and ice cream, everybody feeling fine and voicing appreciation just as the old clock in the city hall boomed out twelve bells.

Just outside was a beautiful sight, all cars were covered with about four inches of snow, the right cars could only be found when the keys fitted the door locks. What did anyone care anyway, Friday was a holiday—so thanks to the entertainment committee of Tom, Jim, Charlie, and John Acheson for this splendid affair.

* * *

The Branch met at King Edward Hotel on April 5. Mr. Archie Smith in the chair.

The new attendance book was put into effect with each member signing his name as he entered the room, this book was headed by Mr. Archie Smith who is our president for the next fiscal year. Keep up the good example, Archie.

After the various reports a letter was read from W. J. R. Kennedy and the application of A. Medina of Toronto was balloted on. He became an associate member and according to his qualifications Mr. Medina should be a valuable addition to our membership.

There being no speaker for the evening, Mr. Price had a problem he wished to solve. Bill wanted to know what caused the brighteners to disappear in his nickel solution when plating zinc die castings—formula of the castings

not known. This caused quite a discussion. Another member produced a steel toaster base that was nickel and chrome plated and showed us where the chrome had separated half the nickel deposit or lifted a layer of nickel, leaving a layer of nickel on the steel. This unusual occurrence was plainly seen and he stated this happened about every three months or so to three or four in each batch.

Chairman Smith then gave a blackboard talk on making racks and stationary anodes for chrome plating frypans. Plating two pans on one rack with stationary anodes was quite a trick. This talk proved very interesting to all the members.

Our chairman spoke about the Dayton convention and also reminded the members of the first Friday in May when the Buffalo Branch will be with us.

Q. What caused layer of Ni to lift from steel toaster base?

A. Interrupted current in Ni Sol.

Q. What caused brightness to vanish from Ni Sol. when plating die castings?

A. If pH is right, add brightener.

Meeting adjourned 10.30.

J. S. CAIRNS, *Secy.*

Philadelphia Branch. [From the *Platers' Reminder.*] The March meeting was well attended, invitations having been sent to both the Electroplaters and Electro Chemical Society local sections; while Dr. Lukens' talk on the "Mechanism of Conductance" entailed a lively and lengthy discussion.

Essentially his experiments tend to prove a change in the concept that some of the ions in an electrolyte are forced by an electric charge toward the opposite polarity and instead show that all the ions have charges and are free to move according to their potentials as determined by distance and location in relation to anode and cathode. With some reservations this theory explains why a high rate of deposition may be maintained, while at first examination it would appear impossible for sufficient deposition to take place at the known speed of anions and cations under the older straight line force theory.

The last Lancaster meeting was treated to an excellent discussion on polishing by Captain Sullivan of Divine Brothers Co., several of the members bringing their polishing wheels in for explanation of difficulties encountered, to which questions Captain Sullivan had the answers or valuable suggestions for improvements.

The next Lancaster meeting on Friday, April 12, to be held at Stahr Hall, Franklin and Marshall College, will feature your editor's motion picture, "The Story of Steel for Plating Purposes," and exhibit examples of both

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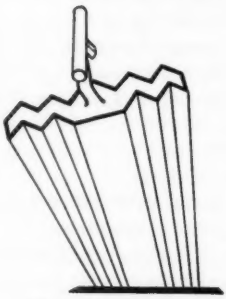

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poor and good steels with their effects on the final appearance of the finish.

Before the meeting a dinner party will be held at the German Kitchen at 6 P.M. in Lancaster, to which all are invited who care to attend. The food is excellent and the prices very reasonable.

After the meeting adjournment will be made to a central city location, to be announced, for liquid and other refreshments. Come one, come all.

Lancaster is taking a very active stand both educationally and socially; so much so that the Supreme Executive Board has decided to grant their permanent charter in the minimum time and W. J. R. Kennedy will be on hand in April to confer it. The least Philadelphia Branch can do will be to have a good representation present.

Philadelphia Branch is also making a departure from their regular routine in April by having a dinner, a plant visit and a regular meeting which will be addressed by our own member, Dr. E. B. Sanigar, on "A Trip to the Atom," on Friday Evening, April 26.

This will be a further elaboration of the interesting discussion started at our February meeting from Mr. Hirsch's talk on passivity. Dr. Sanigar promises to couch his talk in language understandable by anyone and to present the newer theories of atomic relationships in everyday words. Here is an opportunity to learn some theory which has developed since the school days of the majority of our membership.

The meeting will be held immediately after the dinner and will include the election of officers, the following nominations having already been made: President, Harry Keller; vice-president, Nat Verrelle; secretary, John Himes; librarian, E. J. Zurbach, Jr., board of managers—George Gehling, John Nelson, Joseph Underwood; delegates—E. J. Zurbach, Jr., Joseph Underwood, George Long, Frederick Fulforth, alternates—Paul Mentzer, Albert Hirsch, Harry Keller, Harry Shelley, John Nelson.

The dinner is scheduled for six-thirty P.M. promptly, in the Malay Room of Frieds Restaurant, 5822-26 York Road, two blocks north of the Olney Avenue subway terminal of the North Broad Street Subway. Also served within one-half to two blocks by routes 26, 65, 55 and 6 as well as bus lines.

Free Parking is provided to Frieds patrons on the Esso Station Parking lot, York Road and Conlyn Street just north of the restaurant. Have your parking ticket stamped.

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It is imperative that the management have all reservations not later than April 15.

Following the dinner and meeting those present will be conveyed by automobile to the plant of the Proctor Electric Co., 7th Street and Tabor Road, where an inspection will be made of the new plating equipment (installed last year) in operation. This includes full automatic nickel and chrome installations as well as some special purpose machinery of interest to those operating polishing and buffing shops.

In addition the assembly of toasters and irons will be observed which is of interest to those not having seen conveyor assembly operations.

For all this the total cost is $1.00 per person.

President Underwood has appointed John Himes as chairman of the Exhibit Committee and it is hoped we can secure a large exhibit this year. All are to be mounted on 3 x 4 foot boards, black covered and formulae books giving details of solutions and operating conditions must accompany the display in order to compete for prizes.

FREDERICK FULFORTH, *Editor.*

Springfield Branch held its regular monthly meeting at the Hotel Charles on March 25 at 8:00 P.M. Twenty-nine members and guests were present.

The meeting was called to order by President Costigan. The secretary displayed a certificate of distinguished service which had been sent to the Springfield Branch in appreciation for the assistance and cooperation which it had given Newark in helping to make the Asbury Park convention a success. It was voted that the secretary write the Newark Branch and express our appreciation.

Mr. A. Hutchins reported the progress his committee had made in securing exhibits from the Springfield area. The applications of Mr. John W. Murray, Murray Plating Co., and David James Asquith, Moore Drop Forging Co., as associate members were received.

Mr. Costigan then introduced Mr. C. W. Haynes of The C. W. Haynes Laboratories, Inc., Springfield, who presented an interesting talk entitled "Finishing Problems and Their Solutions." Mr. Haynes explained the processes employed in the manufacture

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of the various kinds of organic finishes, and the application and value of the various addition materials.

In the manufacture of a nitrocellulose lacquer the cellulose, either cotton linters or wood pulp, is nitrated with a mixture of nitric and sulphuric acids to make it soluble. A combination of alkyd and synthetic resins is then added to give adhesion. Drying oils, usually a combination of fast, slow and semi are added to combine the properties of each. A plasticizer is added to afford flexibility, and then pigments, if colors or tints are desired.

When he explained the requirements of a satisfactory lacquer for cheap women's jewelry, our good president was not to be found napping and the slip-of-the-tongue was quickly rectified.

The talk was illustrated with samples and a practical demonstration of the infra-red drying lamp. The enthusiasm which the talk aroused was clearly shown by the number of questions which were fired at him.

At the conclusion of the talk Mr. Haynes was given a rising vote of thanks. The meeting was adjourned at 10:15 P.M.

D. S. HARTSHORN, JR., *Secy.*

Wing your way to Dayton
the Birthplace of Aviation

Cleveland Branch held its April meeting on the 6th in Parlor 34, Hotel Cleveland. Weather fair and cool. Attendance thirty-three.

The applications of Richard M. Smith, of the White Sewing Machine Corp., and of D. F. Mosher, of the Lea Mfg. Co., as associate members, were received. Nathan Hartman and Sam J. Henry were elected as active members.

Chairman Singler, of the Entertainment Committee, announced that our party would be held on May 11, in the Empire Room of the Hotel Cleveland. Mr. Singler had the tickets on hand and started their distribution. He also strongly urged the members toward exhibiting at the Dayton Convention, offering his experience and help to those who desired to exhibit.

The following were elected for the coming year: President, P. R. Lyons;

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USED BY THE LEADERS IN THE INDUSTRY
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vice-president, Harold Seitz; secretary-treasurer, F. J. Opatrny; librarian, John Honnecker; board of managers—Fred Matts, W. E. O'Berg, J. O. Singler; delegates—Fred Matts, W. D. Scott, W. E. O'Berg; alternates—E. S. Thompson, C. F. Ott, S. Miller.

After the meeting adjourned, suitable refreshments were served and the singing started. Under the able leadership of Mr. Morrow, Cleveland is rapidly developing some real barbershop harmony.

P. R. LYONS, *Secy.*

Bridgeport Branch held its regular meeting April 4, in the Chamber of Commerce Rooms, Stratfield Hotel. President William Ehrencrona conducted the meeting with about thirty members present.

Good progress regarding the Regional Banquet was reported.

President William Ehrencrona and Secretary-Treasurer Gene Phillips, because of other pressing activities, declined to serve for another year. The following officers were elected: President, John E. Charleson; vice-president, Charles McElroy; secretary-treasurer, Joseph Sterling; librarian, Clarence C. Helmle; sargeant-at-arms, John Schneider; board of managers—B. F. Kusterer, Wm. Stratton, George Karl; delegates to the National Convention—John E. Charleson, Joseph Sterling, R. J. O'Connor; alternates—Axel Boggild, Elmer Monson, Clarence C. Helmle.

Joe Sterling gave the members an interesting talk on polishing techniques and methods of employing the abrasives and wheels to the best advantage. Many of the members discussed this subject, making the educational session interesting to all. Meeting adjourned at 11:00 P. M.

EUGENE PHILLIPS, *Secy.*

Newark Branch A.E.S., met on Friday evening, March 15, at the Club Room of the Hotel Douglas.

A letter was read from Mr. Royal F. Clark, Sr., telling us all about his experiences at Odgensburg, N. Y., Freeport, Ill., and back at Odgensburg again, where he is at the present time.

The application of Mr. William Spence of the N. J. Optical Co. to active membership was received. Mr. George Wagner, chairman of the Newark-New York Educational Session and Jamboree, stated that all arrangements for this event had been completed.

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EGYPTIAN *Superior* FINISHES

The president then called on Mr. L. A. Critchfield and Mr. K. McMillen, president and trustee of the newly organized Lancaster Branch, for some remarks. He next presented the guest speaker for the evening who was none other than our own librarian, Mr. Paul A. Oldam, who gave us a very interesting talk entitled, "The Effect of Base Metal upon Color of Gold Electrodeposits."

Mr. Oldam's talk was in no way technical but very practical. He pointed out the various means by which the loss of metal as dragout from solution can be traced, as unaccounted metal. He especially mentioned as a cause of dragout, the insufficient number of reclaim rinse tanks. One reclaim rinse tank does not reclaim all of the dragout. A series of three reclaim rinse tanks were illustrated and we were shown just how much each tank accumulated over a period of three months. During the course of operating a gold solution there are certain physical and mechanical appliances that are necessary to use to maintain a solution so that it will function properly. Of these, he discussed the kind of work, anodes, scoops, to recover fallen articles, thermometers, stirring rods, overflow of solution, skimming paper, filter paper, racks and various type of stock used in making racks. All were described, showing just how and when metallic losses occur.

Mr. Critchfield, who is also quite an authority on gold plating, disagreed with Mr. Oldam on just one point and that was the effect of the amount of carbonates in a gold solution on the color of the deposit. Mr. Oldam was given a rising vote of thanks for his talk. Meeting adjourned at 11 P.M.

GEORGE WAGNER, *Secy.*

Wing Your Way to Dayton the Birthplace of Aviation

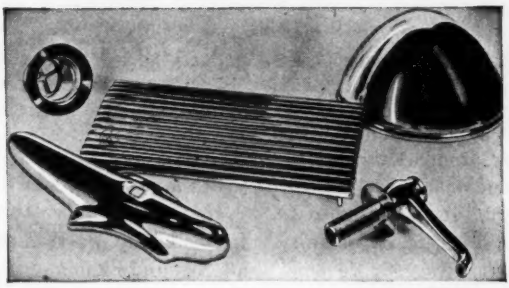
Pittsburgh Branch met Friday evening, April 5, at the U. S. Bureau of Mines. Mr. Hedden was back after a period of illness. Mr. Donald Shantz urged members to get as many exhibits as possible ready for the Dayton convention.

Following the short business meeting Mr. R. L. Lunt of Alloys Plating Laboratories continued his talk started at our March meeting. Mr. Lunt's talk was on "Invention and Electroplating," in which he dealt primarily on the electrodeposition of alloys.

His talk was extremely interesting as it dealt with many revolutionary ideas on plating. His purpose of plating alloys is to obtain finer crystal structure, and physical and chemical properties not found in the individual metals. Instead of using the conventional alloy anode, Mr. Lunt proposes using individual anodes of each constituent of the alloy and hooking these up in separate circuits with adjustable voltages on each to regulate the composition of the alloy. In order to get a uniform alloy it is necessary to have a flowing electrolyte and a moving anode. Under these conditions Mr. Lunt plates in the range of 1400 to 4000 amperes per square foot. He also claims to plate a much larger variety of alloys than is customary, such as chromium, tin, and aluminum; chromium, tin, and silver, and nickel and chromium. The setup is particularly well adapted for plating strip.

At this point Mr. Lunt stopped his talk to answer the many questions asked by the group. At our next meeting on May 3, Mr. Lunt has promised to talk about solutions and demonstrate his lecture with the actual plating of alloys. Everyone was so interested that our May meeting promises to be very very well attended.

Following the discussion of Mr.



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Excellent Throwing Power

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Seymour Bright Nickel utilizes the hot Watts bath. It is an organic process free from promotor metal, very stable and easy to control under most difficult conditions. A simple volumetric analysis determines the concentration of brightener in the bath. Operating conditions are wide, pH 3.0 to 4.5 It does not pit, hence no anti-pit agent need be added. Any standard 99% plus nickel may be used, but we recommend our special-grain "Seycast" Nickel Anode. Full technical data on request.

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BRIGHT NICKEL PLATING PROCESS

Eliminates Buffing or Coloring

Lunt's talk, Mr. John A. Honnecker of Frederick Gumm Chemical Company displayed and told about many of the interesting things being done in the plating field. Mr. Honnecker called his address "Streamlining the Platers' Horse and Buggy." It was designed to give the average plater an opportunity to observe samples of recent developments. Among the recent processes of which Mr. Honnecker had samples were plating on plastics, plating applied to hydrogen brazing, bright steels, available for plating, electroforming of screen, Krome-Alume process, and Corronizing.

The meeting was adjourned at 10.30 P.M.

FRANK R. KELLER, *Secy.*

Wing Your Way to Dayton the Birthplace of Aviation

Buffalo Branch held its regular meeting at the Bailey Bowling Academy on Friday, April 12. President Joe Ruff called the meeting to order. The minutes of the previous meeting were approved as read. The regular business was concluded by a financial statement by our treasurer, Mr. A. Boy.

Librarian Wernlund introduced the guest speaker, Mr. F. C. Mesle of the Oneida Community Plate Corporation. Mr. Mesle has an enviable reputation in his particular branch of the plating industry. His talk on "Silver Plating," which was of considerable length, was clearly illustrated by lantern slides. Fortunately for the secretaries of the various branches who have had the pleasure of hearing him as guest speaker, the subject matter of his address has already been included in last year's "Convention Proceedings."

Undoubtedly the high light of the evening was the introduction and demonstration of the various ingenious gadgets he has devised for measuring thicknesses and adherence of deposits. The Mesle Chord Method was fully explained. Mr. Mesle also proved several points regarding adherence, of which more will be heard in the future.

He was given a hearty vote of thanks for his highly practical and instructive address and he unquestionably opened up several new lines of thought for his audience.

The meeting adjourned at 11 p. m. followed by the customary refreshments.

RODERICK MCGHEE, *Secy.*

Anderson Branch held their March dinner meeting at the Anderson Y.M.C.A. on March 18. The meeting was very well attended and we had a member of our own branch as the speaker of the evening. Mr. George Onksen, Sr., gave a talk on the etching of aluminum, brass and steel which showed very clearly the progress that has been made along this line in the last twenty-five years. After the talk, there was a general discussion of the different processes for etching.

The business meeting followed and Mr. Orville Stewart was elected to the membership of the Anderson Branch. A committee to handle the Anderson Exhibit was appointed by our president, Mr. E. L. McKinney. The committee consisted of Mr. Rex Oyler, chairman, with Mr. Lyle Williams and Mr. Fred Brower assisting.

There being no further business the meeting was adjourned.

OTTO W. MCCALLISTER, *Secy.*

New Haven Branch. The open meeting for the month of March was held on Tuesday evening, March 5, with Mr. H. A. Grove of the Republic Steel Corp., Masilon, Ohio, as guest speaker. Mr. Grove had for his subject

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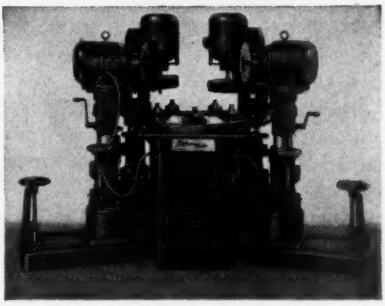

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WE DO MANUFACTURE JUST THE BEST BUFFS WE KNOW HOW AND THEY ARE USED BY MANY OF OUR NATION'S LARGEST INDUSTRIES.

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—"The Rolling and Finishing of Sheet and Strip Stainless Steel." The talk which included a fine description of the different type mills, pickling and polishing equipment, etc., proved to be most informative, and was followed by a lengthy question-answer period conducted by Tom Chamberlain and Mr. Geiger.

On March 26 in coincidence with the course in metallurgy which is being conducted by the New Haven Branch, Dr. William A. Mudge of the development and research division of the International Nickel Co., gave a most interesting lecture on "Nickel Alloys, Their Manufacture, Properties and Uses." Accompanying the lecture, Dr. Mudge showed a one-reel sound movie entitled "Nickel Hi-Lites." In his talk, the story of nickel from the ore itself through the refining processes, etc., was cleverly narrated. Due to the widespread interest in this talk, the lecture was thrown open to members of other Connecticut branches, their friends, etc., as well as the members of the metallurgy class. There were some 100-125 people present at this lecture.

As a fine sequel to the above talk the April 2 open meeting found Mr. G. F. Geiger of the Research Division of the International Nickel Co. as guest speaker. His talk entitled "Characteristics of Electrodeposited Nickel" dealt with the structure of nickel deposits, effect of basis metal on the deposit, results of heat-treatment of the deposit, comparison of deposits obtained from various types of nickel solutions and also heavy nickel deposits.

The March 19 meeting of the metallurgy class was conducted by Ben McGar, metallurgist at the Chase Brass and Copper Co., Waterbury, Conn. Ben talked on "Mill Finishing of Copper and Copper Alloys." Following the lecture, the Vox Pop shop problems, conducted by Tom Chamberlain, were held.

Lecture No. 11 of the metallurgy course was held Tuesday April 9 and the subject of the evening was "Iron and Steel." Mr. H. Keschan, steel metallurgist at Chase's, gave the lecture. An outline of each lecture is given all the class members for their assistance and future reference.

A large delegation of members is expected to attend the Annual Regional Banquet comprising Branches from Hartford, Waterbury, Bridgeport, as well as New Haven, on Saturday, April 27, at the Hotel Elton in Waterbury.

JOE SULLIVAN, *Secy.*

Lancaster Branch. Dreams can only be realized when accompanied by hard work and effort on the part of those interested in fulfilling them. Those of us in Lancaster who were interested in promoting the advancement of electroplating were very amply repaid when the Supreme Executive Board granted and presentation was made of our permanent charter. This was the highlight of our April meeting

Any plating solution analyzed by professional chemists for only one dollar. We also sell reagent solutions at reduced prices.

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and in the absence of our executive secretary, Mr. Kennedy, the presentation of the charter was made by Mr. George Gehling. Despite the efforts of Mother Nature to dampen our spirits the meeting was attended by forty-three members and guests.

The following were elected to membership: Messrs. Ellis Hunter, Karl Nuss, Alvin Withers and Wilbur Miller. The following applications were received: Messrs. Richard Fields, Lloyd Mowrer, Arthur Ream and Ralph Boyd. The secretary announced that with the four elections of this date the membership of the Lancaster Branch was twenty-nine.

Mr. Schwalm, chairman of the Exhibit Committee for the National Convention, outlined his plans and requested cooperation from the various companies who were represented at the meeting.

Upon receipt of the permanent charter it became necessary to nominate officers to serve for the next year. It was unanimously agreed that all those who served under the temporary charter should be renominated for all the offices. Messrs Critchfield, Klunk and Hoenstine were nominated as delegates to the National Convention. No alternates were nominated at this meeting

At the close of the business session the speaker, Mr. Fred Fulforth of the Proctor Electric Co., gave an illustrated lecture on "The Story of Steel for Plating Purposes." Samples of poor and good steels, showing their effect on the final appearance of the finish, were also exhibited. The movie and lecture were very interesting and clearly showed the extreme care which is required in order to produce this highly finished steel.

The meeting adjourned at 10 P.M. and most of those present proceeded to the Arcadia where refreshments were served and a period of fellowship was enjoyed.

H. L. Hovis, *Secy.*

Milwaukee Branch convened for its 307th regular meeting in the Colonial Room of the Republican Hotel at 7:45 on Friday, April 5, with all officers present.

We received one new application, and the applications of four associate members to change their status to that of active members. Three new members initiated.

The banquet committee reported that all was in readiness for our annual affair on April 6.

The following were elected as the officers of the Branch for the coming year: President, Jack Geissman; vice-president, Rodney Olsen; secretary-treasurer, Dexter Rhodes; librarian, Henry Bornitzke; board of managers—Dan Wittig, Al Hermansen, and William Geissman; delegates to the Convention—Ray Goodsell, Robert Goodsell, and William Geissman—alternates, Robert Steurnagel, Jr., Phil Ritzenthaler, and Harry Unke.

Henry Bornitzke introduced Mr. Harold Faint, who gave a very interesting and informative informal talk on the slow speed wheel, heavy pressure and loose abrasive method of polishing steel. Thank you, Mr. Faint. The meeting adjourned at 10:20.

Dexter F. Rhodes, *Secy.*

Wing Your Way to Dayton
the Birthplace of Aviation

Newark Branch, A.E.S. held its meeting Friday evening, April 5, at the Club Room of the Hotel Douglas Newark, N. J.

A communication from Mr. W. J. R. Kennedy with reference to a correct membership total and per capita tax

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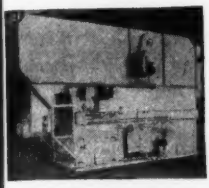

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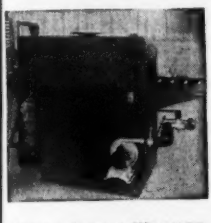
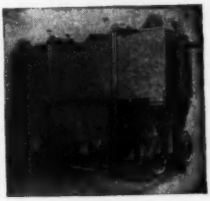


ALKALI SPRAY WASHER WITH ROLLER CONVEYOR



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was read and the Branch voted that the request be complied with and the tax be paid. The following communications were also read: Two letters from Mr. William J. Wise of the Dayton Branch; a letter from Mr. Charles C. Conley, chairman of the 1940 convention Committee and a letter from Mr. R. M. Goodsell, supreme president.

An application for Mr. P. H. Staub of Merck and Co. to associate membership was voted on and Mr. Eugenio L. Villacorta was elected to associate membership.

The secretary reported that the Annual Educational Session and Jamboree was a success. The Educational Session was attended by about 155 members and the Jamboree by 318 persons. The entertainment and music were tops. Everyone had a wonderful time.

Mr. Oldam, our librarian, next presented the guest speaker for the evening, Mr. Louis Donroe, who continued his subject, "Information Please," which he started about a year ago. Following are some of the electrolytes which were discussed: Rochelle salts, copper, bright nickel, molybdenum, etc. Mr. Donroe's discussion was very interesting and he was given a rising vote of thanks by the thirty-four members who attended. Meeting adjourned 10:30 P.M.

GEORGE WAGNER, *Secy.*

Binghamton-Syracuse Branch of the A.E.S. held its March meeting in Cortland Friday night March 29. We got a break on the weather at last and about twenty were out.

We had as our guest our supreme secretary, Mr. W. J. R. Kennedy, who told us about his trips to the various branches and he also boosted the Convention. The report of Mr. Kennedy was certainly inspiring to us of the smaller branches.

We were delighted to welcome again Mr. Bert Sage of the Buffalo Branch also Mr. George Merz of the Harshaw Chemical Company and a member of the Buffalo Branch A. E. S.

The speaker of the evening was one of our own members, Mr. Norman Prince of the Scobell Chemical Company, Rochester, New York, who gave us an illustrated talk on "Water." This was something considerably different but we feel we have started something other branches would do well to follow. The splendid paper Mr. Prince had prepared was followed with close attention by everyone present and the slides were very interesting.

The tremendous difference in water of different localities was clearly brought out by the speaker. Hardness tests showed extremes as far apart as .314 grams per liter for one city and 4.37 grams per liter for another. Mr. Prince emphasized that any chemically conditioned water (municipal water softeners and the like) must have a chemical effect on the plating solution and the new high speed Brite Nickel solutions are extremely sensitive to some of the chemicals that are used.

After listening to this paper and the subsequent discussion it becomes very evident that the very thing we all use the most of, we know the least about. This Branch certainly feels that it has one member at least who knows plenty about water and we recommend him very highly to other branches.

After plenty of discussion the meeting adjourned about eleven P.M. The April meeting to be addressed by Mr. L. Sullivan of Divine Brothers Company, Utica, N. Y. April 26, the date.

Bert Sage drove Mr. Kennedy and yours truly to Binghamton after the meeting to catch a train to Newark. After a cup of coffee and a sandwich at two A.M. in one of Binghamton's Swank Spots (Bert Sage notwithstanding) we surprised Bill by having a band escort him on the train and ride down with him, we trust Bill was soothed to sleep with the great Kay Kyser and his band. Bert Sage nearly broke his neck trying to find Ginny Sims but I guess she saw him first and ducked. Bert did, however, have quite a gab with Kay Kyser; tried to sell him on Brite Nickel for his band instruments.

We hope Mr. Kennedy enjoyed his annual visit to our Branch, we certainly were glad to see him again.

GEORGE SIMMONS, *Secy.*

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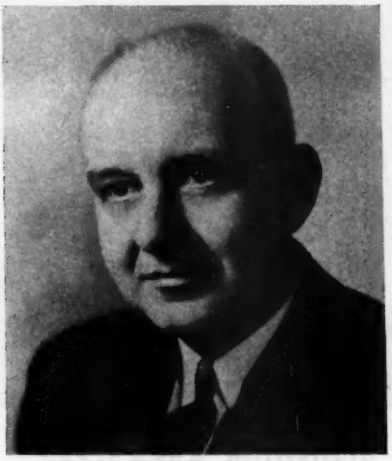

C. M. KNIGHTS

Mr. Knights having spent practically all of his working life in the electroplating field, is known throughout the industry, especially in the West. He is popular not only in his own company, where his associates know him as "Chick," but everywhere in the trade, which he has impressed with his pleasant personality and his keen desire to serve his customers to their best advantage. He takes his new post with the good wishes of all of his associates and many friends throughout the industry.

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A handy Carboy Truck made by Barrett-Cravens Co., Chicago, minimizes the hazard of transporting carboys, handling them from storage or truck to process faster, safer and easier.

These practical units have two arms which are spread open by means of a readily accessible pedal and which close against the crate housing the carboy when the pedal is released.

The arms lift against the cleats on either side of the crate, at the same time securely holding it for transporting.

With this equipment, one man can readily handle full or empty carboys.

Rugged welded steel construction is used throughout with rigidly reinforced tubular steel handles. The unit is light in weight, occupies a minimum of floor space, and maneuvers easily even over rough floors.

Literature is available from the manufacturer and units are available for free trial or test.

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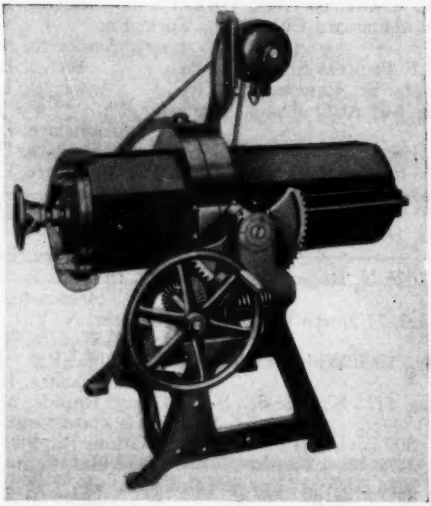

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Membership Report

To April 1, 1940

ELECTIONS

Charles E. Snyder, 10th and Walnut St., Harrisburg, Pa..
Active, Lancaster Branch

Charles B. Wilson, 139 Ruby St., Lancaster, Pa. Associate, Lancaster Branch

Joseph Kirchener, 23 Ruby St., Lancaster, Pa. Associate, Lancaster Branch

M. P. Gross, 37½ E. Orange St., Lancaster, Pa. • Active, Lancaster Branch

George R. Ford, 205 N. Prince St., Lancaster, Pa.
Associate, Lancaster Branch

Harold Craley, Bareville, RFD 1, Penna. Associate, Lancaster Branch

Joseph Masek, 330 E. College Ave., York, Pa. Active, Lancaster Branch

Norman J. Gebert, American Chain Co., York, Pa.
Associate, Lancaster Branch

John Leitner, 469 E Princess St., York, Pa. Active, Lancaster Branch

John Stipe, 515 Poplar St., Lancaster, Pa. Associate, Lancaster Branch

Theodore Schwalm, 304 Atkins Ave., Lancaster, Pa.
Associate, Lancaster Branch

Samuel Hilt, 33 S. Fifth St., Columbia, Pa. Associate, Lancaster Branch

H. E. Kilheffer, 603 Benton St., Harrisburg, Pa. Associate, Lancaster Branch

Harvey C. Reynolds, 1809 Berryhill St., Harrisburg, Pa.
Active, Lancaster Branch

John M. Reynolds, 1809 Berryhill St., Harrisburg, Pa.
Active, Lancaster Branch

H. Allan George, 7675 N. Rogers Ave., Chicago, Ill.
Associate, Chicago Branch

Bernard H. Schenkel, 77 North Water St., Rochester, N. Y.
Associate, Rochester Branch

Joseph J. Duffy, Jr., 1000 Widener Bldg., Philadelphia, Pa.
Associate, Rochester Branch

Harry Don Burgess, 1113 Sigsbee St., S. E., Grand Rapids, Mich.
Associate, Grand Rapids Branch

Walter E. Moline, 800 Livingston Ave., N. E., Grand Rapids, Mich.
Associate, Grand Rapids Branch

George H. Otters, 5116 2d Ave., Los Angeles, Cal.
Associate, Los Angeles Branch

Rock J. Chartrand, 806 S. Bonnie Brae St., Los Angeles, Calif.
Associate, Los Angeles Branch

Eugenio Villacorta, Box #673—Cebu City, Philippines
Associate, Newark Branch

A. W. Medina, 242 Sterling Rd., Toronto Associate, Toronto Branch

J. H. Johnson, 51 Hook Ave., Trenton, Ont. Active, Toronto Branch

C. Neun, 10 Grofton Ave., Toronto Active, Toronto Branch

Robert G. Peterson, Minneapolis, Minn. Active, Milwaukee Branch

Francis B. Henry, 37 Wayne Ave., Youngstown, Ohio
Associate, Cleveland Branch

Sam J. Henry, 37 Wayne Ave., Youngstown, Ohio
Active, Cleveland Branch

Nathan Hartman, 13909 Beaumont Ave., E. Cleveland, Ohio
Active, Cleveland Branch

Isaac W. Watters, 402 E. 13th St., Cincinnati, Ohio
Associate, Cincinnati Branch

Thomas L. Fields, 2165 Clara St., Cincinnati, Ohio
Associate, Cincinnati Branch

William J. Ehlen, 114 Woodside Place, Ft. Thomas, Ky.
Active, Cincinnati Branch

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PRESIDENT

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Joseph J. Visse, 1224 Fourth Ave., Dayton, Ky. Active, Cincinnati Branch
Paul Casper Hoffman, 2955 No. 23d St., Milwaukee, Wis.
Associate, Milwaukee Branch
Raymond Rexford Goodsell, 723 Lathrop Avenue, Racine, Wis.
Associate, Milwaukee Branch
Frederick R. Lunn, 618 Chatham St., Montreal, Que.
Associate, Montreal Branch
George M. DeCamp, Box 662, Providence, R. I.
Associate, Providence-Attleboro Branch
Pierre B. Lonsbury, 2 Dunham St., Attleboro, Mass.
Active, Providence-Attleboro Branch
Walter L. Larson, 243 Washington Ave., Providence, R. I.
Associate, Providence-Attleboro Branch
Arthur J. Hutchins, 67 Taylor St., Springfield, Mass.
Active, Springfield Branch
Thomas Arnott Murdoch, Dunira Dulater, Scotland
Active, Springfield Branch
Karl Nuss, 11th and Mulberry Sts., Harrisburg, Pa.
Active, Lancaster Branch
Wilbur Miller, RFD #3, Lititz, Pa. Active, Lancaster Branch
Alvin Withers, RFD #4, Lititz, Pa. Active, Lancaster Branch
Ellis Hunter, Stony Creek Mills, Pa. Associate, Lancaster Branch
Herbert Earl Adams, 138 W. 10th St., Indianapolis, Ind.
Associate, Anderson Branch
Thomas H. Adams, 138 W. 10th St., Indianapolis, Ind.
Associate, Anderson Branch
Orville Paul Stewart, R. R. 7, Anderson, Ind. Associate, Anderson Branch
Chester G. Borlet, Harshaw Chemical Co., 1627 W. Fort St.,
Detroit, Mich. Associate, Detroit Branch
Carl V. Yerger, 1220 Ridge Ave., N. S., Pittsburgh, Pa.
Active, Pittsburgh Branch
Walter J. Laughner, Wireton, Pa. Active, Pittsburgh Branch

APPLICATIONS

William P. Catucci, 47 Woodland Rd., Bloomfield, N. J.
Associate, Newark Branch
Louis E. Gehm, 571 Leanech Rd., Ridgefield, N. J.
Associate, Newark Branch
Frederick H. Hitchcock, 1190 Seward, Detroit, Mich.
Associate, Detroit Branch
Joel Lawrence Leete, 7637 Oakland, Ave., Detroit, Mich.
Associate, Detroit Branch
A. J. Sandecki, 1839 Thomas St., Chicago, Ill. Active, Chicago Branch
M. K. Young, 220 W. Calhoun St., Woodstock, Ill. Active, Chicago Branch
Harry Don Burgess, 1113 Sigsbee St., S. E., Grand Rapids, Mich.
Associate, Grand Rapids Branch
Walter E. Moline, 800 Livingston Ave., N. E., Grand Rapids, Mich.
Associate, Grand Rapids Branch
John W. Murray, Old Acre Road, Springfield, Mass.
Associate, Springfield Branch
David J. Asquith, 56 High St., Springfield, Mass.
Associate, Springfield Branch
William Spence, 556 Jesse Place, Union, N. J. Active, Newark Branch
P. H. Staub, Merck & Co., Inc., Rahway, N. J. Associate, Newark Branch
Tom Laken, R. 1, Box 392, Kenosha, Wis. Active, Milwaukee Branch
Arthur Ream, 830 Walnut St., Columbia, Pa. Associate, Lancaster Branch
Richard Field, 31 North Lime St., Lancaster, Pa. Associate, Lancaster Branch

24 TONS OF LAUNDRY A DAY

ALL OF IT WASHED THE WYANDOTTE WAY!

WYANDOTTE likes big jobs! Whether it's a job of laundry production or a job of metal cleaning production, we're equipped to deliver results and keep the cleaning line *moving*.

Here's an example: A big laundry uses Wyandotte to wash *96 thousand pieces a day!* That's *24 tons* of work a day, *13 million pounds a year!* A man-sized job, done by Wyandotte at minimum cost!

Just as the Wyandotte Laundry Service Representative solved this laundry's problem with a Wyandotte product, *your* local Wyandotte Industrial Representative can help you to determine which of the many Wyandotte metal cleaners will do your job best. Simply write to The J. B. Ford Sales Co., Wyandotte, Mich.

Wyandotte

SERVICE REPRESENTATIVES IN 88 CITIES

THE J·B·FORD SALES CO· WYANDOTTE MICH·

HEADQUARTERS FOR GOLD & SILVER SALTS

Merck Gold and Silver Salts are manufactured carefully and by precision methods. The finished products must undergo a score of separately conducted tests. Even minor metallic impurities are removed entirely or reduced to insignificant limits.

Prices Will Be Mailed on Request

The Merck line includes:

GOLD

Bromide **Tribromide**
CYANIDE **CHLORIDE**
& Potassium Cyanide
& Sodium Chloride
& Sodium Cyanide

SILVER

Precipitated **Acetate**
Bromide **Carbonate**
CHLORIDE **CYANIDE**
Iodide **Sulfate**
OXIDE **NITRATE**

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Harlan M. Gale, P. O. Box 97, Brookline, Mass. Associate, Boston Branch
William M. Smith, 3298 West 41st St., Cleveland, Ohio
Associate, Cleveland Branch

SUSPENSIONS

Richard M. Smith, 14211 Mayfair Ave., East Cleveland, Ohio
Associate, Cleveland Branch
Alfred J. Penman, 6211 Snow Road, Parma, Ohio
Associate, Cleveland Branch
Emil Gralski, 516 W. Highland Ave., Milwaukee, Wis.
Active, Milwaukee Branch
Bernard Weslowski, 2478 So. 15th Place, Milwaukee, Wis.
Associate, Milwaukee Branch

DEATH

Harold L. Pierson, Torrington, Conn.

Transfer to Active Membership

Russell Rother	Milwaukee Branch
Phil Ritzenthaler	Milwaukee Branch
Herbert Thiemann	Milwaukee Branch
William Geissman	Milwaukee Branch

MILWAUKEE BRANCH'S ANNUAL EDUCATIONAL SESSION AND DINNER DANCE

On April 6, at the Hotel Schroeder, another of Milwaukee's annual get-togethers became history.

Nearly two hundred men convened at the Educational Session in the Green Room. We heard excellent papers by George Hogaboom, Walter Pinner Gustav Soderberg, and Al Hermansen. The program was very well balanced, and there is no doubt that everyone present went home better informed than before.

Two hundred ninety-seven people were seated in the Crystal Ball Room at seven in the evening for the dinner dance. Again the Committee gave us evidence that they know their business, be it plating or arranging for the social betterment of our members and guests. The dinner was excellent, and the entertainment first rate.

Dancing continued until twelve-thirty, and all went home tired but happy.

May we say particularly to our guests that we enjoyed your company, and hope that you will be with us again next year.

DEXTER F. RHODES, *Secy.*

ALKALINE CLEANING

An attractive illustrated booklet on the application of alkaline cleaning to various types of industry has recently been published by the Pennsalt Cleaner Division of the Pennsylvania Salt Manufacturing Company. Short concise paragraphs, with accompanying colored illustrations, tell now alkaline cleaning may be successfully applied to the removal of dirt, oils, drawing compounds, paint, etc., from all metals prior to plating, enameling, painting, or bonderizing in soak, electrolytic, and power washer cleaning operations.

Some of the other points covered in this booklet are the cleaning of floors, walls, machines, buses, and locomotives. Those interested may obtain this booklet free by writing to the Pennsalt Cleaner Division of the Pennsylvania Salt Manufacturing Company, 1000 Widener Building, Philadelphia, Pa.